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SPICILEGIUM

NEILGHERRENSE;

OR

A SELECTION

OF

NEILGHERRY PLANTS,

DRAWN AND COLOURED FROM NATURE,

WITH

BRIEF DESCRIPTIONS OF EACH; SOME GENERAL REMARKS ON THE GEOGRAPHY AND AFFINITIES OF NATURAL FAMILIES OF PLANTS, AND OCCASIONAL NOTICES OF THEIR ECONOMICAL PROPERTIES AND USES.

BY

ROBERT WIGHT, M.D., F.L.S., &c.

MEMB. IMP. ACAD. NATUR. CURIOS.: ROYAL RATISBON BOT. SOC.: EDINR. BOT. SOC.: CORR. MEMB. HORT. SOC.; SURGEON MADRAS ESTABLISHMENT.

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1851.

MISSOURI
BOTANICAL
GARDEN.

COMPOSITÆ.

By far the largest order of the vegetable kingdom and the most widely distributed of the Dicotyledonous division. Of species, there are already known and described, nearly, if not fully, 10,000, derived from every quarter of the known world, from the Equator to both polar circles and from the level of the ocean almost to the line of perpetual congelation. But though thus general they are far from being equally distributed as regards the proportion they bear, in each region, to other plants. In France they are estimated to amount to about 1 in 8 : in Germany, 1 in 15 : North America, 1 in 6 : Sicily, 1 in 2 (?): Tropical New Holland 1 in 23, &c. In India they probably amount to about 1 in 20 and on the Neilgherries to about 1 in 15. These estimates are however only approximations, but are sufficiently near to show the general predominance of the family over all others, which is still more conclusively established by the better ascertained fact of their species constituting about one tenth of those of the whole flowering vegetation of the earth.

A family of such vast extent and at the same time so very natural has engaged much of the attention of Botanists with a view to its subdivision in such a manner as will facilitate the investigation of its species by grouping them in well defined and naturally disposed tribes and genera. Great progress has undoubtedly been made in this work, especially in the monagraph of the late most excellent Professor DeCandolle who devoted nearly 10 years of his valuable life to the completion of that most arduous undertaking, carefully availing himself, throughout, of the labours of his predecessors. But much as he has accomplished it cannot be doubted that much remains to be effected before it can be admitted that even an approximation to perfection has been attained. The family as a whole, may be said to be, one of the most easily recognized of the vegetable kingdom: as regards the Indian Flora this is certainly the case, there being only one genus (*Xanthium*) of our Flora referred to it, about which any one, previously acquainted with a few species, could entertain a doubt and it cannot, I think, be admitted as a true congener.

The marks by which Compositæ are distinguished are few in number and generally easily made out—Flowers in heads, surrounded by an involucrum. Florets, seated on a receptacle, furnished with a variously formed pappus calyx, but which is sometimes obsolete or wanting. Corolla superior, monopetalous, lobed, the lobes furnished with marginal veins,

æstivation valvate. Anthers usually cohering by the margins forming a tube round the style. Ovary 1 celled with a single erect ovule. Stigma usually 2 cleft. Numerous other particulars appertain to them, but these are the essential peculiarities of the order. They however, require to be taken together as each, viewed separately, may be found in other families but never all together. For example, many plants have capitate inflorescence and some have their florets bound by an involucrum as in true *Compositæ* and even a pappus calyx, as *Dipsaceæ*, but they want the venation of the corolla and its valvate æstivation, the usually cohering anthers and erect ovules. *Lobeliaceæ* have cohering anthers but differ in every thing else. Many families have valvate æstivation of the corolla but are deficient in other characteristics. Solitary erect ovules are also met with but uncombined with the other marks. It thence follows that this is usually a very distinct and easily recognised family not liable to be mistaken for any other.

In Geographical distribution its predilections are in respect to temperature, very decidedly temperate, comparatively few being found within the tropics, though they abound in the warmer latitudes just beyond. The Indian Flora is estimated to include about 700 species for all India. The Neilgherries alone have nearly 100, while the plains from Cape Comorin to Ganjam can scarcely furnish an equal number and many of these, being drawn from the vegetation of the lower ranges of hills, belong to the Subalpine rather than Champaign Flora. A family embracing so many species must almost necessarily furnish many plants both highly ornamental and useful to man. Our flower gardens abound with the former, including Chrysanthemums, Zinneas, Everlastings, Asters, Sunflowers, Coriopsids and a thousand others, but especially the magnificent Dahlia which takes unquestioned precedence of all others; the finer varieties of which can scarcely be excelled, when well cultivated, for richness of colouring and ornamental effect in the well disposed parterre. The number of species which it contributes to the economical purposes of man is scarcely less considerable. The common garden Lettuce and Endive are among the best known of these, but the Artichoke, Cardoon, Jerusalem Artichoke, Salsafy, &c. &c., are all much cultivated as esculents. The flowers of some yield pigments : the seed oils of fine quality. A vast number are used in medicine for the cure or alleviation of numerous diseases, and among them a very few only are known to be possessed of acrid or virulent properties, of these *Arnica montana*, a Swiss plant, known in English gardens under the name of Mountain Tobacco, is the most conspicuous. Many are intensely bitter combined with aromatic properties, hence, possessing tonic and febrifuge virtues. But on these it would be out of place to dwell in this work.

Various arrangements have been proposed to facilitate the investigation of species of this most natural family of plants, hitherto with but indifferent success. I shall here confine myself to a brief explanation of the last, that of the lamented DeCandolle, as being the one according to which the few species introduced into this work are distributed. He divides the whole family into three primary groups or classes.

1st. TUBULIFLORÆ having the bisexual or hermaphrodite flowers tubular. Those of the ray, when present, are usually female and to that extent imperfect and abnormal.

2nd. LABIATIFLORÆ having the hermaphrodite flowers, divided into two lips—Of this division the Neilgherry Flora furnishes no representative.

3rd. LIGULIFLORÆ all the flowers hermaphrodite, with the petals split along one side, resembling the ray florets of the first class or suborder. These primary divisions again are divided into 8 tribes, namely

1. *Vernoniaccæ* style cylindrical, its arms long and subulate, occasionally short and blunt, covered all over with bristles.

2. *Eupatoriaccæ* style cylindrical, its arms long and clavate with a papillose surface on the outside near the end.

3. *Asteroideæ* style cylindrical, its arms linear flat on the outside equally and finely downy on the inside.

4. *Senecionideæ* style cylindrical its arms linear fringed at the point, generally truncate, but sometimes extended beyond the fringe into a cone or appendage of some sort.

5. *Cinareæ* style thickened upwards and usually fringed at the tumour.

6. *Mutisiaceæ* style cylindrical, somewhat tumid near the apex, its arms usually blunt or truncated, very convex on the outside, and covered, at the upper part, with fine uniform hairiness, or absolutely bald.

7. *Nasuviaceæ* style never tumid branches long linear truncate fringed only at the point.

8. *Cichoraccæ* style cylindrical branches linear truncate equally pubescent. These tribes are again subdivided into subtribes and divisions.

This arrangement is ingenious and often succeeds in bringing together very natural groups, but seems to me to labour under the disadvantage of being constructed on too narrow a foundation, a few, and these often almost inappreciable, variations of the style and stigma seem scarcely sufficient for the support of such a gigantic superstructure as is raised upon them, the more so, as but little practice is required to furnish exceptions, not easily got over, in every tribe. It is however the last method which has been proposed and what is of perhaps greater weight we have now a complete monograph of the order constructed on it, whence, for the present at least, it is generally adopted by Botanists. And they are under very great obligations to the late accomplished professor DeCandolle for his untiring application in reducing to regular form that which, previous to his labours, was a perfect chaos. It must not however be overlooked that the original plan did not originate with him, but with Cassini and Lessing, especially the latter, whose divisions he has closely followed in the arrangement of his materials. In working out these it seems to be the general opinion of Botanists that he has needlessly multiplied genera, an error not at all times easily avoided, but not on that account the less to be regretted, as the example of so great a proficient in the science can scarcely fail to be extensively followed by the less competent observers.

When writing an account of this family for publication in my Illustrations of Indian Botany I made a list of all the genera found in India and with them prepared a "synopsis of the genera of Indian Compositæ" In this synopsis the characters are some-

what abbreviated and the arrangement of their parts considerably modified. DeCandolle's arrangement commences with the Capitulum followed by the Involucrum—Receptacle—Corolla—Stamens—Achœnium (seed)—Pappus—and the natural character of the plant. The peculiarities of all these parts are more or less fully described in each character while in fact the really essential points, after the sectional ones, are usually derived from the capitulum, achœnium, and pappus. In this way many peculiarities not essential to the recognition of the genus, and liable to perplex the student, are admitted into the character, by which it is often greatly lengthened without obtaining any commensurate advantage. To avoid the perplexity which such a plan occasionally involves I have commenced mine with the capitulum, followed by the achænium and pappus as supplying the really essential points of the character. These again are followed by the natural character or habit of the plant including the involucrum, receptacle and flowers. In this way no point of even minor importance is overlooked while marked prominence is given to those which are really essential. The generic characters adopted in this work are those of the synopsis with such additions as may from time to time seem desirable.

TRIBE I.—Vernoniaceæ.

This tribe is for the most part recognised, at first sight, by its homely, I had almost said, weed-like aspect, the capitula being generally without ray or ornament of any kind, and the flowers without brilliancy of colouring. It now includes between 60 and 70 genera six or eight of which have Indian representatives. The flowers are tubular, equally 5 cleft, with the longish deeply cleft style projecting from the throat, extending its long cylindrical arms on either side. Of the Indian species, the colour is usually a, more or less deep, lilac hue. The pappus is generally rigid and seen under a magnifier rough. The receptacle is either alveolate or beset with bristles, the whole inclosed by a many scaled imbricated involucrum.

Subtribe—Vernonieœ *capitula discoid homogamous.*

Div. Euvernonieæ—*anthers ecaudate involucrum, not compressed,* polyphyllus.*

VERNONIA.

Capitulum usually many flowered. Achænia with a cartilagenous callus at the base and a large epigynous disk. Pappus usually a double series, the interior one bristly much longer than the paleaceous outer one. Herbs, shrubs, or trees: leaves alternate often glandulose: involucrum imbricated, interior squamæ longest: receptacle naked or rarely fimbrillose: flowers few or many: corolla regular, 5 cleft, usually purple or rose coloured, filaments smooth.

This genus is one of great extent 290 species being defined in the 5th volume of DeCandollis prodromus and, since the publication of that volume 10 years ago, so many species have been added that I imagine the number of published species now exceeds 350, upwards of 30 of which are natives of India. In America they are much more numerous but do not seem in either country to merit much considertion as I do not find any notice taken of any of the species in works treating of the useful properties of plants. One Indian species *V. anthelmintica* is held in repute in this country as a remedy for worms, as the name implies, but I have never known it used though sufficiently common and easily procured. As ornamental plants they merit but little regard the one figured in this work being about the best looking of those found in this part of India and it must be confessed that, as seen growing, it has a very weed-like appearance little likely to obtain favour in the eyes of the lover of fine flowers.

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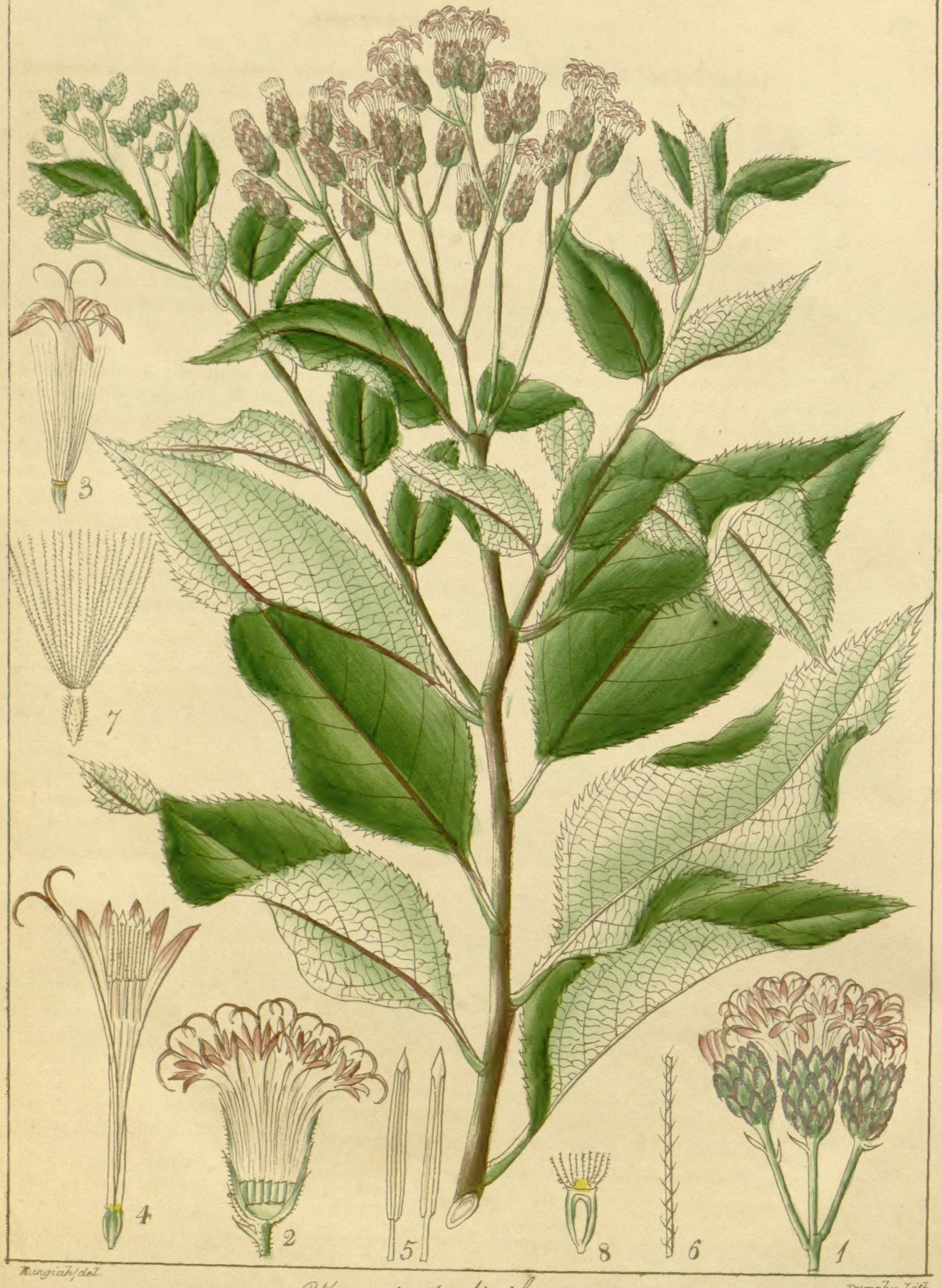
* This is in contradistinction to another division in which the capitula are somewhat flattened.



Rungiah del. Dumphy, Lith.

Vernonia pectiniformis (D.C)

Kurz gezeichnet.

Drumphy, Tirich.

Decaneurum reticulatum (D.C)

This genus is very nearly allied to the following, which is distinguished by the pappus of this being in a double series in that a single one with 10 ribbed achænium. Whether generic value ought to attach to points of such apparently small importance may be questionable, but still as they provide the means of somewhat reducing an overgrown genus they are not likely to be objected to in this instance whatever may be the case, in others where the necessity of employing such is less urgent.

VERNONIA PECTENIFORMIS (D. C.) shrubby, branches teretesmoothish, younger ones angled, pubescent: leaves short petioled, ovate lanceolate, acuminated, pectinately and deeply serrated, membranaceous; glabrous above pilose beneath: cymes terminal, corymbose, naked: capitula long pedicelled, many flowered, ovate: scales of the involucrum dry, glabrous, ciliated, ovate-oblong, obtuse or subacute, mucronate, tipped with brown.

Neilgherries not unfrequent in clumps of Jungle.

Decandolle defines what he states to be two very nearly allied species under the names *V. pectenata and pecteniformis* the one from the Neilgherries the other from the Pulney range. I have specimens from both stations and after a careful comparison confess I am unable to discover specific differences: and therefore infer one of them must be reduced. Under these circumstances I ought, perhaps, to have adopted the Neilgherry name, *V. pectenata*, but was induced wrongly, I now fear, to adopt the other, partly on account of seniority, it being the older of the two by 2 years, but principally because having compared it with an authentic specimen of *pecteniformis* I found them, I think, identical and feeling therefore pretty sure that the specimen figured is truly the plant whose name it bears, I without further consideration at the moment adopted it. It was not until more than a year after, when arranging the materials for this work, that I was led to reconsider the matter and now think that I have erred in preserving the present name which is dependent on the other. The plant is sufficiently common about the outskirts of "scholahs" especially where the soil is somewhat humid.

DECANEURUM.

Capitulum many flowered. Achænia usually glabrous marked with ten prominent ribs. Pappus one series, bristles thick, rigid, densely barbellate. Herbaceous or suffrutieose plants, leaves alternate: involucrum imbricated many series often surrounded with foliacious bracts: capitula usually solitary terminal: receptacle flat alveolate: flowers regular 5 cleft, purplish.

This as compared with the last is a small genus including only 14 or 15 species, all of tropical origin and for the most part Indian. Four however of those described by DeCandolle are from Africa, two Continental, one from Madagascar and one from the Island of Bourbon. The Moluccas furnish one and Ceylon two. Judging from the wide geographical range which this small genus occupies, it seems probable that further researches in Africa will bring many more to light. The Indian peninsula produces two in addition to those known to DeCandolle from this region, one new, which I have figured in my Icones under the name of *D. Courtallense*, and another, which may also be new, but which I consider *D. Silhetense* D. C., and have published, in the same work, under that name. The Neilgherries furnished two or probably three species. The one selected to represent the genus though not a showy plant is not altogether unornamental, and probably under cultivation might be improved were it not that it is almost aquatic in its habits, being always found in wet or even marshy ground. Of the properties of the genus nothing is yet known. It was first established in 1833 by DeCandolle and published in my "Contributions to Indian Botany:" recently the priority of the name has been disputed in favour of another, which claims to be of older date, which it would appear had been overlooked by the professor when naming this genus, a circumstance the more remarkable as it also belongs to a composite plant.

DECANEURUM RETICULATUM (D. C.) stem suffruticose, erect, ramous, every where rough with bristly hairs: leaves sessile, ovate, mucronate, and mucronately sub dentate; rough above, densely whitish tomentose beneath; nerves and veins scabrous reticulated: peduncles few, axillary and terminal, capitula closely embraced by numerous foliacious bracts; interior scales of the involucrum scariose, glabrous, longer than the bracteas.—*D. C. Prod. 5 p.* 866.

Neilgherries, frequent on the banks of streams all over the hills, and in flower nearly all the year; but in greatest perfection from June to September. Plant from 2 to 4 feet high flowers purple.

The specific name is descriptive of the under surface of the leaves which is very pale or whitish netted all over with darker coloured veins, very conspicuous in the dry specimen, the state in which it was seen when named. The generic characters are well developed in this species which therefore is a favourabe one for studying them.

MONOSIS.

Capitulum one flowered. Achœnea glabrous terete. Pappus 2, 3 series, bristles rigid scabrous. Trees or shrubs :leaves alternate : panicles naked, the ends of the branchlets bearing subumbellate sessile capitula : scales of the involucrum imbricated, obtuse, shorter than the solitary flower : corolla rose coloured.

This genus was constituted in 1833 for the reception of the plant here represented and named with reference to the solitary flower of each capitulum. Two additional species from Mexico were subsequently added, and a third is doubtfully referred to the genus by DeCandolle. Two more have since been added, one from Mexico the other from Brazil, found by Mr. Gardner. The latter more nearly associates with the Indian species than the Mexican ones, being referable to the same section of the genus.

The Neilgherry plant differs from the American ones in its arborous, habit, often attaining 40 or 50 feet in height with a stem upwards of 2 feet in circumference. It is abundant on the eastern slopes below Coonoor and Kotergherry, and when in flower, as well as when the seed is approaching maturity, a very conspicuous object owing to the large panicles which terminate each branch. The leaves are large, obovate, somewhat pointed, strongly transversely ribbid and of a course rigid texture not unlike those of the teak.

The remarkable peculiarity of this genus, that of having only a single floret in the involucrum, is so far as I am aware only met with in two or three other genera in the order (*Shawia*) being one : that also is referable to the same tribe along with another having only two. Many genera have few flowered capitula, but there are very few examples where syngenesious plants lose their aggregate character by having single flowered capitula with many scaled involucra.

MONOSIS WIGHTIANA (D. C.) Arboreous, branches terete, velutino-tomentose: leaves petioled obovate subacute, cuniate and obtuse or subcordate at the base, entire, penninerved, glabrous or somewhat velvetty on the nerves above; velutino hirsute beneath: panicle very ramous, capitula sessile at the apices of the subcorymbose ramuli : scales of the involucrum obtuse, tomentose on the back.—*D, C. l. c. p.* 77.

A large tree, abundant on the Eastern slopes of the Neilgherries below Coonoor. On the sides of the deep dell leading down to the bottom of the Catherine falls at Kotergherry there are some noble trees of this species.

It owes its specific name to the circumstance of having first become known through the medium of specimens preserved and sent home with my collections in 1828.

TRIBE III ASTEROIDEÆ.

This is a large tribe including, according to DeCandolle upwards of 170 genera, thirty-one of which have representatives in the Indian Flora. America however is the head quarters of the tribe. There the genus aster is found in all its glory and contributes largely to ornament the flower borders of European gardens. The tribe is distinguished by having the Capitula, usually, heterogamous, namely, female florets in the ray and bisexual ones in the disk ; sometimes they are homogamous, that is, having all the florets uniformly bisexsual, or monoicous and occasionally they are dioicous, all males on one plant and all females on another. The Styles of the hermaphrodite flowers are cylindrical above and bifid with longish linear somewhat flattened, often subacuminate, rarely obtuse branches ; externally minutely perberulous. The Stigmatic lines of glands are slightly prominent, extending to the origin of the external pubescence. The Corolla pellucid, staminigerous, tubular, regularly dentate. The pollen globose echinulate. From these characters it would appear that the tribe, if really a natural one, presents considerable diversity of form and structure of the flowers, but all bound together by the uniformity of character presented by the style and stigmas. In the subdivision considerable importance is attached to the colour of the flowers, namely, whether homochromous, the disk and ray of the same colour or heteroch-

Rungiah, del. Dunphy, Lith.

Monosis Wightiana

Rungiah del. Dumphy Lith.

Erigeron Wightii (D. C.)

romous of different colours. The anthers also afford sectional characters, according as they are prolonged downwards forming a kind of tail, caudate or ecaudate; so also the receptacle, whether naked or chaffy (paliaceous) and the leaves, whether opposite or alternate, all of which as well as others not noticed are wanted in discriminating the genera of this large and very difficult tribe.

Sub-tribe. *Asterinæ, capitula homo or heterogamous usually radiate. Anthers ecaudate. Leaves almost always alternate.*

ERIGERON.

Capitulum one flowered radiate, Ligulæ linear female, several series: disk flowers tubular, either all bisexual or with the exterior ones female. Achænia compressed beakless. Pappus one series.—Herbaceous or suffruticose plants: leaves alternate: capitula hemispherical: involucrum two or three series: receptacle naked foveolately punctuate: flowers of the ray white, blue or purple; of the disk yellow.

Of this large genus including nearly 100 species a few only, about 10, are natives of India and nearly equally divided between the plains and mountains; but upon the whole it is an extratropical genus, the plurality of its species being natives of North and South America beyond the tropic and those found within these limits being, for the most part, alpine; a few are found in Europe. The one here represented is very common on the Hills and to be met with at almost all seasons, but especially in the earlier months of the year, after the rains, in almost every moist pasture. DeCandolle has described another species as occurring on the hills under the name of *E. Leschenaultii.* The differences in the character of the two plants are so slight that I cannot divest myself of the belief that the two form but one species and that the differences indicated are referable rather to individual specimens, than distinct species. The specimen of *E. Wightii* sent to DeCandolle was an indifferent one, those of *E. Leschenaultii* might have been bitter, but a comparison of this plant with the original specimen of *E. Wightii*, leaves scarcely a doubt on my mind of these being scarcely varieties of the same species; and as this is the only one found on the Hills at all corresponding with DeCandoll's character of *E. Leschenaultii*, presume that one of these names may be suppressed. The original specimen of *E. Wightii* is somewhat more hispid and the peduncles shorter, but then it is clearly less luxuriant and had grown in a drier less fertile soil. I am thus particular in directing attention to the circumstance of two nearly allied species being supposed natives of the hills in the hope that others, having better opportunities, may be induced to examine the subject with the care necessary towards arriving at a correct conclusion. The flowers of *E. Leschenaultii* are said to be white of *E. Wightii* purple, an obvious mark which may materially assist the enquirer.

ERIGIRON WIGHTII (D. C.) stem erect shortly ramous: leaves oblong, the inferior ones attenuated at the base, subserrated, somewhat obtuse; superior ones entire, acute, all puberulous on both sides: capitula, pedicelled sub racemose: scales of the involucrum rough on the back, linear subulate, equaling the disk: ligulæ very slender, longer than the disk: achænia glabrous.—*D. C. l. c.* 5. 286.

On the Neilgherries not unfrequent in moist pastures, flowering during the rainy season. Ligulæ pale purple several-series, branches hispid, plant greyish white.

If there are indeed 2 species I now think, so far as I can make out from description, that this of the two agrees better with *E. Leschenaultii* than *Wightii* though it has the purple flowers of the latter.

MYRIACTIS.

Capitulum heterogamous. Flowers of the ray two or many series female: ligulæ very narrow: of the disk hermaphrodite. Achænia compressed beakless often glanduliferous at the apex. Pappus none.—Erect, dichotomously ramous herbs, with alternate leaves: peduncles long 1-cephalous paniculate: capituala globose: involucrum 1-2 series: receptacle naked flowers white or yellow.

This small genus of six species is exclusively of Asiatic origin, three species being found in India, two in Java, and one in Persia. I am only acquainted with the present one, which is sufficiently common on the

hills, growing in dry pastures. Some specimens I have seen, growing in arid rocky ground, were so reduced in size that at first sight they appeared to be Daisies and were of course eagerly appropriated and greatly prized until closer inspection showed the mistake. The difference between them and the specimen figured was much greater than between the two plants referred to in the preceding article and, probably, had they been sent as distinct species to even so acute and skilful an observer as the late professor DeCandolle, might have deceived him. The figure gives a good idea of the form of the plant but an indifferent one of the flowers which are white.

MYRIACTIS WIGHTII (D. C.) sparingly pilose: inferior leaves ovate with a long cuniate attenuation at the base, coarsely inciso-serrate; the superior ones oblong entire sessile; the apices of the teeth and of the leaves themselves calloso-mucronate.—*D. C. l. c. p.* 5. 308.

Neilgherries not unfrequent in pastures, minute forms of it growing in arid stony ground sometimes resemble the Daisy. "Radicle leaves ovate attenuated into the petiole, the inferior cauline ones cuniate at the base, sparingly dentate, the upper ones subsessile acuminated at both ends: capitula terminal solitary, 4-6 lines in diameter: involucrum somewhat hairy reflexed after blooming: ligulæ white about 2 series becoming revolute in drying."—*D. C.*

Sub-tribe Baccharideæ *Capitulum heterogamous or dioicous never radiate all the florets tubular; usually several series of female ones in the circumference. Anthers ecaudate: receptacle epaliaceous. Leaves alternate.*

The plants composing this sub-tribe are most unlike those of the preceding and might, at first sight, well give rise to doubts regarding the propriety of the arrangement which places them in their present situation. A closer examination, however, shows that the discrepancy is more apparent than real. Here as in the *Asterinæ* we have two distinct sets of flowers the females in the circumference and the male or hermaphrodite ones in the centre, so that, in so far, the difference is mainly in the form of the female flowers, tubular here ligulate there; but the style and stigmas correspond. The same tubular forms of ray flowers are found in the next sub-tribe, but in the subsequent ones *Inuleæ* and *Eclipteæ* the radiate forms return, thus forming a circle combining what, upon the whole, appears a very natural group.

DICHROCEPHALA.

Capitulum heterogamous. Flowers all tubular: marginal ones female many series; 3-4 toothed; central ones, hermaphrodite or male, few; 4-5 toothed. Achænia compressed beakless, of the females bald of the males and hermaphrodites crowned with one or two bristles.—Annuals with alternate leaves and few small globose capitula racemosely or paniculately arranged, shorter than the naked pedicels: involucrum, when present, expanding: receptacle naked conical: flowers purplish.

This is a small genus seven species only having as yet been discovered. Two of these are natives of the Neilgherries and five of India. Both the Neilgherry ones occupy a wide geographical range, one being found in Java, China and other parts of India, the other, the one figured, in Java and on the hills. They are easily distinguished by the size of the capitula, those of *D. chrysanthemifolia* being fully double the size, of those of the other, while the leaves of *D. latifolia* are broader and larger than those of this. They are found about houses and neglected places in short pasture, but are little known, having nothing in their appearance to attract notice, they may however, be viewed as Botanical curiosities.

DICHROCEPHALA CHRYSANTHEMIFOLIA (D. C.) erect ramous, the whole plant rough from close set short hairyness: inferior leaves lyrately pinnatified; the superior ones oblong, cordately semiamplexicaul, coarsely serrated; the upper ones entire: penduncles much longer than the capitula.—*D. C. l. c.* 5. 372.

Frequent on the Neilgherries about road sides and in neglected places, apparently in flower most part of the year.

The little coloured glands on the outer surface of the corolla deserve notice here as does the calicine rim of the achænia, as showing that the long pappus of other species of the order, of which this is a modification, is in truth a real calyx though a very peculiar one.

Rungiah, del.

Dunphy, lith.

Myriactis Wightii (D.C.)

Kuingsbury del. Dumphy, Lith.

Dichrocephala chrysanthemifolia (D.C.)

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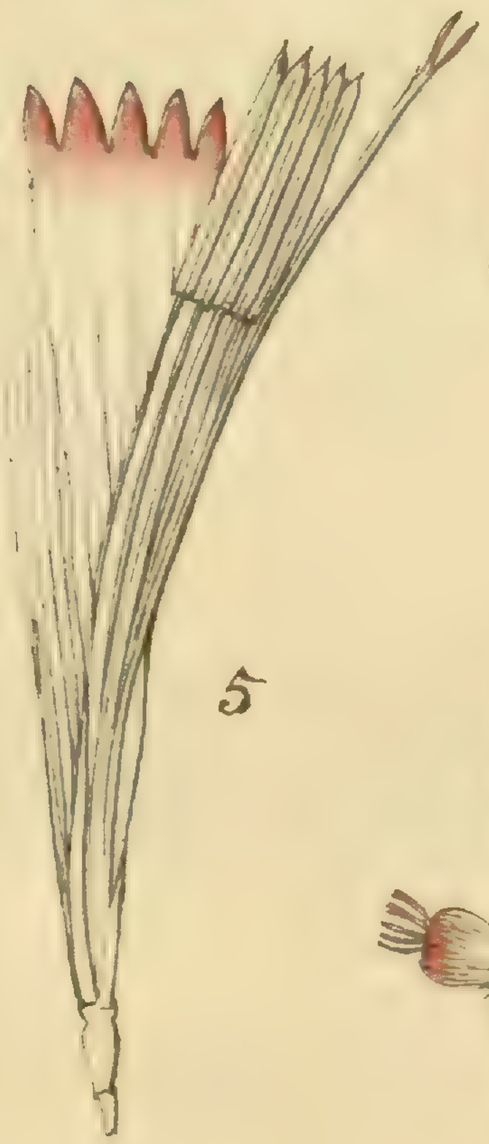

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Rungiah, del.

Dumphy, Lith.

Blumea alata (D. C.)
B. cernua

Sub-tribe Tarchonantheæ *capitula either dioicous (male and female on different plants) or heterogamous ; never radiate. Female flowers of the circumference many series very slender ; of the disk hermaphrodite or male, fewer and larger. Anthers caudate. Leaves alternate.*

BLUMEA.

Captitulum heterogamous. Flowers of the circumference many series truncated, 2-3 toothed, the throat scarcely dilated. Anthers very slenderly caudate at the base. Achænia terete. Pappus 1 series bristles capillary scarcely rough.—Herbaceous plants with panicled or loosely corymbose inflorescense : involucrum imbricated many series, scales linear acuminated : receptacle flat, naked, or sometimes hairy : flowers yellow or purplish.

This is an extensive genus first established by DeCandolle in the Archives Botanique for 1833, regarding which the author remarks. "It includes about 80 species nearly all undescribed. They are natives of India and a few of Africa ; I have not yet found any from America. Being obliged to give a new name to a genus so eminently Indian, I have dedicated it to M. Blume, author of the Flora of Java, who himself found many of the species and has rendered great service to Indian Botany. He well merits a more brilliant genus but I hope the great number of species will compensate for the modesty of their aspect."

The genus thus introduced to the notice of Botanists has since then been augmented to nearly 100 species. As remarked by the author, their aspect is certainly modest, but they form an interesting group distinguished from some other nearly allied genera by their terete not compressed seed, the latter being the distinctive mark of *Conyza*, with which most of the previously described species had been confounded.

The one here shown is not characteristic of the habit of the genus but is well suited to give a good idea of its Botanical characters. It is besides a plant so abundant and so strongly marked in its aspect that it is not liable to be mistaken by any one wishing to study the characters of the genus. I have met with it in other places besides the Hills.

Blumea alata (D. C.) stem herbaceous erect ramous and, like the leaves, clothed with short redish pubescence : leaves elliptic oblong. dentate, decurrent, forming wings along the stem : peduncles axillary one or few headed, racemosely panicled : capitula suberect : exterior scales of the involucrum lanceolate, foliaceous, squarrose, pubescent ; interior linear scariose as long as the flowers.—Flowers purple males 10 or 12.—*D. C. l. c. 5. 448.*

Neilgherries not unfrequent. Of this species there are 2 varieties referred to by D. C β cernua and γ Napalensis. The plant represented belongs to the former—"stems herbaceous erect ramous, like the leaves clothed with short redish pubescence: leaves oblong acuminate, denticulate, decurrent, forming wings along the stem, peduncles axillary 1 or few headed racemosely panicled recurved : capitula cernuous : exterior scales of the involucrum lanceolate, foliaceous, pubescent, the interior ones long shining scariose recurved at the points, at length patent." This species seems very near *B. vernoniodes*, are they not varieties of the same species differing in the degree of clothing, the one "tota dense velutino hirsuta", the other (*V. alata*) "pube brevi subrufa pubescenti-velutenis."

TRIBE IV.—Senecionideæ.

This is the largest tribe of the order including, according to DeCandolle's arrangement, no fewer than 388 genera to which many have since been added. Of these 388 only 36 have representatives in the Indian Flora, showing how small a proportion Compositæ bear in India to the rest of the vegetable kingdom. The proportion Compositæ bear to the vascular plants of the world is about 1 to 10 : in India they do not quite amount to 1 in 20. In this tribe, the proportion its Indian genera bears to the whole, is about 1 to 10; but I suspect the proportion of species falls short of that ratio. Among its species are to be found some of the most splendid flowers to be met with in the vegetable kingdom, such as the Dahlia, Sunflower, &c. and on the other hand numerous others are as unassuming as these are conspicuous. Among its species too are many of the most useful plants, in an economical point of view, belonging to this family.

The essential distinctions of the tribe lies in its cylindrical deeply cleft style, the arms linear fringed at the point, generally truncate but sometimes extended beyond the fringe into a cone or appendage of some sort. Corolla of the disk pellucid, pollen globose echenulate. These marks unquestionably aid in enabling a beginner to ascertain whether a plant under examination belongs to this tribe, but are too loose and deficient in precision to be of much use until practice has familiarized him with the forms and characteristic features, if I may so call them, of the plants belonging to it, when they are but little regarded. On this point Dr. Lindley justly remarks, "there can be no doubt that the genera are needlessly multiplied; a very little practice tells us that the genera collected under the signs above given do not in all cases exhibit these signs, as is evident from the figures executed under the eye of DeCandolle himself; and we know that, in fact, genera find there place by considerations apart from those ostensibly put forward by DeCandolle."

A reference to the magnified figures of the few genera represented in this work will tend to establish the justice of these remarks.

Sub-tribe Melampodineæ. *Flowers unisexual, no hermaphrodities, Male and Female in different plants (dioicous) or in different capitula of the same plant (hetorocephalous) or in the same capitulum monoicous: anthers ecaudate: receptacle usually paleaceous: pappus never setose.*

As regards Indian Botany this subtribe has very few representatives, three or four being all that is known and one of these, *Xanthium*, scarcely meriting a place in the order, being, as compared with the rest, most anomalous in structure. Of the genus here represented only 2, or at most 3 species are known, one continental and one, or perhaps two, from Ceylon, the native country of the one first described and on which the genus is founded.

MOONIA.

Capitulum monoicous. Flowers of the ray 1 series female ligulate, limb 3 cleft; of the disk male. Branches of the style of the female linear revolute; of the male included simple or slightly cleft at the apex, sterile. Achænia obovate somewhat compressed entire or shortly bicornute at the apex. Shrubs: leaves opposite: peduncles terminal 1 cephalous: involucrum 2 series, the exterior spreading recurved; interior erect: **receptacle paliaceous paliæ membranous 1 nerved: flowers yellow.**

This genus was first defined by Dr. Arnott and named in honor of the late Mr. Moon the zealous superintendent of the Ceylon Botanic garden. As above stated, only two, or at most 3 species, are yet known, one or, probably, two from Ceylon and the present which abounds on the Neilgherries, especially about the Avalanche where it is found round the outskirts of every wood, flowering abundantly in March and April, but I believe is in flower at all seasons. There, it is a diffuse very ramous shrub seeking support from its neighbours, though not a climbing plant, and in favourable situations may be met with upwards of six feet high.

MOONIA ARNOTTIANA (R. W.) shrubby, erect, ramous: leaves opposite, unequally pinnatified, the terminal lobe larger, deeply 3 cleft: pinnæ lanceolate, acuminate, coarsely inciso-serrated, glabrous: flowers of the ray numerous: achænia entire at the apex.—*R. W. Icon.* 1105.

Neilgherries and Pulney mountains in clumps of jungle—on the former, common near the Avalanche Bungalow and in almost every clump of jungle from thence to near Sisparah.

This plant seems not unworthy of a place in the flower garden, many less deserving being already found there. It has nothing common or weed-like in its aspect and it seems highly probable that, grown in dry but rich soil, the flowers would increase in size and number at the expense of the stem and leaves. It would also possess the charm of novelty for though abundant about the Avalanche it is quite unknown about Ootacamund.

M. heterophylla (Arnott) suffruticose? leaves opposite, petioled, entire or biternately divided, with mucronate serratures: flowers of the ray about 5: achænia marginate bicornute at apex. Ceylon.—*Arn. pugil. D. C. prod.* 7—289.

Rungiah del. Dumphy Lith.

Moonia Arnottiana. (R. W.)

Burgiah del. Dumphy Lith.

Helichrysum buddleioides (D. C.)

Sub-tribe Gnaphalieæ. *Capitula homogamous or heterogamous discoid. very rarely radiate, sometimes* 1 *flowered. Anthers caudate. Achæna crowned with a pilose or setaceous pappus, very rarely bald. Leaves* ***usually alternate.***

To this section the group of Cape plants well known to amateurs in England under the name of "everlastings," belong. They owe their name to the dry chaffy scales of the involucrum, which, in many, are highly coloured and polished presenting almost metallic lustre And as these remain, retaining the brilliant appearance of the growing plant, long ofter they have been gathered, the name seems very appropriate. None of the Indian ones merit, the appellation having neither the brilliance nor durability of their cape congeners.

This subtribe is one of great extent including according to DeCandolle's list 80 genera, and it may safely be doubted whether any other division of the order has proved so troublesome to Botanists as this one. The species are numerous and so closely resembling each other that their discrimination becomes a task of great difficulty and nicety, only to be acquired by much patient investigation of every part of the plant. This has led to the extensive multiplication of genera indicated by the above figures very many of these being confined to one or two species. Such being the case it seems almost unavoidable that some if not many of them should rest on characters so indistinct that none but a very practised eye can detect them. For myself I candidly confess that, even with the aid of named specimens and generally good materials, I have felt myself incompetent to detect the limits which separate some of the genera commonly met with on the hills such as *Helichrysum*, *Gnaphalium*, *Antennaria* and *Anaphalis* : nor can I help thinking, as the result of my examinations, that were the specimens put into the hands of any other Botanist or even D. C. himself, were he happily still among us, that they would all be again referred to the same genera in which D. C. has left them. The plant here figured is referred to the genus Helichrysum but I cannot discover in what respect; it differs generally from some others named. by the same authority *Anaphalis* and they again pass into others respectively named *Gnaphalium* and *Antennaria*. These circumstances are mentioned more for the purpose of showing the difficulties attending the determination of the genera of this tribe than questioning the goodness of the genera themselves which, to a more practised investigator, may be clear enough, though I doubt my own assumption.

HELICHRYSUM.

Capitulum sometimes homogamous the flowers all hermaphrodite, 5 toothed ; sometimes heterogamous the marginal flowers, often very few, 1 series, female. Achœnia beakless sessile with a termenal areola. Pappus 1 series bristles roughish not plumose.—Herbs or shrubs with alternate leaves: involucrum imbricated; scales scariose, interior ones connivent or radiant : receptacle flat, epaleaceous, naked, areolate or fimbriliferous : involucrum white purple or yellow : corolla yellow or purple.

Of this genus DeCandolle enumerates upwards of 200 species, two only of which are found in India ; viz. the accompanying and one from Ceylon. Africa is certainly its head quarters ; but Europe, Asia and Australia all contribute species, none however has yet been found in America. Many of the Cape ones are remarkable for the brilliancy and rich colouring of their involucral scales.

HELICHRYSUM BUDDLEIOIDES (D. C.) stem suffruticose erect ramous woolly towards the apex : leaves sessile ovate lanceolate acuminate entire 7—9 nerved, glabrous above whitish tomentose beneath : corymbs compound polycephalous at the apices of the stems and branches : capitula ovate, densely crowded : scales of the involucrum oval obtuse, about equal, a little longer than the disk.—*D. C. l. c.* 6. 201.

A rather common plant on the Neilgherries forming dense clumps or bushes from 4 t 6 feet high. The white stems and undersurfaces of the leaves contrasting with green upper ones and large clusters of yellow flowers, render this a conspicuous plant. The leaves are from 3 to 4 inches long, 8-10 lines broad : receptacle alveolate shortly fimbrillate : flower of the outer series female or sterile, the rest hermaphrodite : style and stamens included : pappus 1 series pilose scabrous : achænia glabrous.

This handsome perennial attains too great a size to be convenient as a garden ornament, but for the compound that objection does not apply, especially when bounded by clifty rocks, shrubbery or clumps of trees, in such a situations it is conspicuous and ornamental.

CARPESIUM.

Capitulum heterogamous discoid, marginal florets female several series; disk hermaphrodite. Anthers caudate. Branches of the style terete obtuse subglabrous. Achænia oblong compressed rostrate; rostrum beset with viscid glands. Pappus none.—Herbaceous erect plants: leaves alternate: capitula solitary on the ends of the branches: involucrum many series imbricate, exterior ones sometimes foliaceous: flowers yellow.

This is a small genus of 8 species, 7 of which are Indian the other a native of Europe; one is said to be a native of Travancore. Considerable difference of opinion exists among Botanists as to its proper place in the order. It is certainly very unlike the other Gnaphalioid genera met with on the Hills, but as they are few in number that is no criterion. It associates with the tribe in its caudate anthers and heterogamous capitula.

This is a curious looking plant but has no beauty to recommend it to notice. The beaks of the seed are covered with vascid glands which causes them to adhere to whatever approaches them, hence, as the plant is common in the woods, it is no uncommon occurrence for one who has been walking in such places to find his clothes covered with them on returning from his rambles.

Carpesium Nepalense (Lessing) hirsuto-villous: leaves elliptico-lanceolate, acuminate, dentate, attenuated into the petiol: capitula subcernuous, campanulate: interior scales of the involucrum subacute.—Petiols and branches villoso-hirsute, leaves pale and more villous beneath: capitula 4 lines broad.—*D. C. l. c.* 6—281.

A common plant in all the woods about Ootacamund, but so far as I am aware neither useful nor ornamental. To the Botanist only it is interesting.

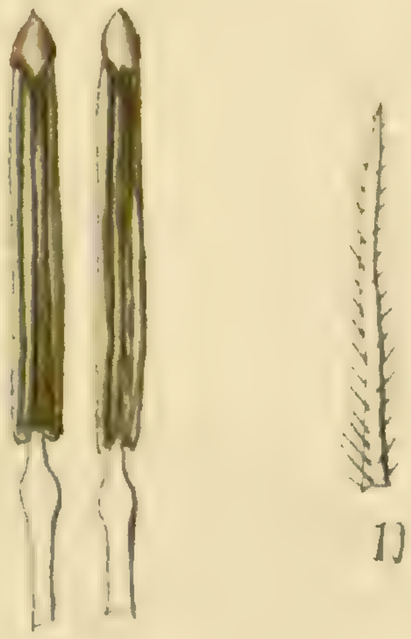
Sub-tribe Senecionæ. *Capitula homogamous or heterogamous; discoid or radiate. Anthers ecaudate, Achænia crowned with a setaceous or pilose pappus the marginal ones sometimes bald. Leaves alternate.*

This, like the last sub-tribe, is an extensive group, more abounding in species but with a fewer genera than it. In that there are 80 genera, in this 25. The difference in the number of species is not so great in proportion. This sub-tribe is only remarkable as including the genus *Senecio* the largest, as regards the number of its species, in the vegetable kingdom, containing, as left by DeCandolle, upwards of 600. In that series the variations in form are numerous and great, and doubtless many genera will yet be constructed out of the genus Senecio, though, as it now stands, the series as a whole is so natural that DeCandolle confesses, that he could not detect characters of sufficient moment to enable him simply to distribute the species into subgenera, and was, consequently, forced to distribute them geographically, grouping those of each geographical division into sections more or less natural. According to these geographical groups it appears that the genus most predominates in Africa, especially towards the Southern extremity, whence 178 species have been obtained, and including Madagascar and Mauritius, 214. The Caucasean district, including Europe and the northern provinces of Africa and Asia, furnish 114; while the whole of America and her Islands only contribute 150—Tropical Asia and all Australia are still more deficient, as they only give 80 to the stock, that is, 45 for Asia and 35 for Australia.

Many of the genera of this sub-tribe are very nearly allied. The principal difference between *Doronicum* and *Senecio* consists in the achænia of the ray of the former being, bald or without pappus, while those of the latter have it. Another genus of this sub-tribe I have separated from *Doronicum* on the ground of both disk and ray flowers being without pappus; generally, however, the genera of this tribe are much more easily distinguished than those of the preceding. Of this sub-tribe but few species are, so far as I am aware, admitted into cultivation and some of them, such as *Senecio vulgaris*, become almost inexterminable weeds.

Rungwin del Dumphy, Lith.

Carpesium Nepalense (Less)



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Dronicum Tessingianum Ann

Doronicum caucasicum (Bieb.)

DORONICUM.

Capitulum radiate heterogamous, ray florets one series ligulate, female or sterile by abortion; disk ones hermaphrodite. Achænia beakless oblong turbinate furrowed, those of the ray bald, of the disk pappose. Pappus setaceous several series.—Herbaceous plants with solitary or several capitula, involucrum one or few series, scales linear: receptacle convex ebracteolate.

This is a small genus of about 20 species nearly half of which are natives of India and five of these found on the Neilgherries. The two figured give a good idea of the habits and general appearance of the plants of this genus which are for the most part easily distinguished, except from *Senecio*, which they generally so greatly resemble that close examination is required for their discrimination.

Doronicum Lessengianum (Arn.) stem long subterete striated hairy: leaves cordate, amplexicaul, oblong lanceolate, few-nerved, deeply and irregularly inciso-serrated: corymbs few cephalate, terminal: involucrum hemispherical, scales linear subulate, the interior ones oblong lanceolate muricately hispid: igulæ 8-10, narrow oval, about 9 nerved.—*D. C. l. c. 6. 322.—Arnott's pugillas—Madaractis scabra, D. C. l. c.*

Neilgherries, &c. flowering cool season after the rains. This plant is found growing in moist soil near springs and water courses. The flowers are large and rather handsome, but the plant as a whole is common looking. It is however very characteristic of the genus, and to any one wishing to study its characters a suitable subject for the purpose.

Doronicum Candolianum (Arn.) suffruticose ramous: branches striated nearly glabrous, few (1-2) cephalous: leaves whitish, hispidly pubescent, pinnatifid: lobes short, oblong acute, occasionally shortly dentate: peduncles minutely bracteolate at the apex: involucrum 1 series, scales lanceolate, whitish, hispid on the back: igulæ 8-10, narrow, oval, 3-5 nerved.—*D. C. l. c. 6. 322.—Arnott's pugillas—Madaractis pinnatifida—D. C. 6. 439.*

Neilgherries, frequent in pastures. A very ramous somewhat diffuse plant, branches terete glabrous naked towards the base, very leafy about the middle, ending in slender somewhat leafy pedunculs, bearing two or rarely three, nearly naked pedicelled, capitula: leaves oblong, pinnatifidly narrow, lobed, nearly to the base, revolute on the margin, hispid on both sides, but especially the under: peduncles leafy at the base, pedicels furnished with a few minute scattered bractioles Scales of the involucrum linear, pointed, coarsely hispid on the back: igulæ about 9, lanceolate, acutish, 4 nerved.

This I consider a more ornamental plant and much fitter for the garden than the other. The small leaves and comparatively large bright yellow flowers entitle it to that distinction, and doubtless were it an exotic brought from Europe it would find favour, but being a native easily procured, it seems to be considered undeserving of notice. Another species of the genus very like this has been long confounded with *Senecio* which I notice for the purpose of showing how much these genera resemble each other in habit and appearance.

SENECIO.

Capitulum homagamous discoid or heterogamous radiate: flowers of the ray female ligulate. Branches of the style of the hermaphrodite flowers truncated, the point only penicellate. Achænia beakless terete or angularly furrowed. Pappus pilose several series, caducous.—Herbs or shrubs, sometimes climbing, with alternate leaves and solitary, corymbose or panicled inflorescence: involucrum one series, sometimes calyculate with accessory squamellæ, often with the points of the scales sphacellate: receptacle naked alveolate. Flowers of the disk always yellow, those of the ray usually so, but sometimes white or purplish.

Through some error on the part of the Lithographer, only one species of this genus has been kept for this work in place of two, a discoid and radiate one as I intended. The error is of less consequence as the two species of *Doronicum* may both be looked upon as representing species of *Senecio* until the achænia of the ray florets are examined and found destitute of pappus which is the essential difference between the two genera. It may perhaps be supposed that the genus might be easily divided into two principal sections according as the capitula have or have not a ray: but on this point DeCandolle observes that, by the adoption of that character the most nearly allied species, or even varieties of the same species, would be disjoined: the same remark is applicable to several other characters that have been supposed suitable for this purpose.

Of the 45 species mentioned above as indigenous in India 7 are found on the Neilgherries or $\frac{1}{7}$th of the whole. This seems a fair proportion considering how large a portion of the genus is extratropical, the bulk of the remaining $\frac{6}{7}$ths being from the Himalayas and upper provinces of India, very few, if any, being found on the plains within the tropies.

SENECIO CORYMBOSUS (Wall—D. C.) stem scandent, terete, araneose (appearing as if covered with cobwebs:) leaves petioled exstipulate, cordately suborbicular, shortly acuminated, subserrated; glabrous above densely tomentose beneath, 5-7 nerved at the base: corymbs axillary and terminal compactly polycephalous: involucrum 8-leaved, bracteolate at the base: ligulæ none: achænia glabrous.—Petiols of the leaves 6-12 lines long, limb about 2 inches in diameter, 10 tubular florets—*D. C. l. c.* 6. 364.

Neilgherries in clumps of jungle climbing to a great extent over the adjoining trees. DeCandolle asks is not this rather a *Cacalia ?* This question it appears to me may be safely answered in the affirmative, in as much as it perfectly agress with both the character of the genus and of the section *Cissampelopsis:* but it may be asked on the other hand, what is the differencc between the two genera and wherein do they differ from *Kleinia* ? So far as technical characters enable us to distinguish them, they are identical, those of *Senecio* including all three, which fact, alone, goes far to prove that more than one genus is involved in that mass of species which has set at defiance the efforts of even so acute and perfect a systematist, as the late very celebrated Professor DeCandolle, to reduce them to order.

Tribe 5 Cynareæ. *Style of the hermaphrodite flowers nodosely thickened above, often penicellate at the knot, branches sometimes cohering sometimes free, puberulous exteriorly: stigmatic series not prominent, extending to the points of the branches and there confluent.*

This, like the preceding, is a large and interesting Tribe, embracing most of the true thistles, artichokes, marigolds, burdocks, &c., DeCandolle enumerates as belonging to it 81 genera distributed into 11 Sub-tribes, 13 of which genera furnish Indian representatives. None of these merit much consideratien here, except perhaps, *Carthamus tinctorius*, the safflower, the petals of which yield a pink dye, and are prepared and sold as a substitute for saffron. Many of the thistles, indeed the tribe generally, are characterized by intense bitterness, hence many of them have at different times been held in repute as remedial agents, though few seem to have preserved their reputation. A few are used as food, such as the artichoke Cardoon, &c., the seed of others are pressed for their oil; and a few are admitted into the garden as ornamental objects.

Sub-tribe Carduineæ. *Capitula homogamous with numerous equal florets, flowers sometimes dioicous, scales of the involucrum many series free, often ending in a spiney point. Corolla 5 cleft. Filaments usually pilose. papillose or glabrous. Anthers ecaudate or shortly caudate. Achænia glabrous beakless with a terminal areola. Pappus plumose or pilose the bristles often united into a ring at the base but not bound by the prominent margin of the achænium.*

To this sub-tribe the artichoke (Cynara) the multiform thistles (Carduus and Cirsium) which cover the fields and waysides in Europe, and the equally common, but more amusing, Burdocks all belong.

CIRSIUM.

Capitulum homogamous. Flowers hermaphrodite or dioicous: tube of the corolla short, throat oblong. 5 cleft. Anthers ecaudate. Stigmas cohering. Achænia oblong compressed glabrous membranaceous ecostate with a fleshy terminal arcola. Herbaceous thistle like plants: involucrum imbricated scales more or less prickly pointed, receptacle frimbriliferous; flowers purple or yellow.

This is a large genus including according to DeCandolle's enumeration, 140 species, three only of which seem to find a place in the Indian Flora, the one here represented occupying the Higher mountain

Senecio corymbosus

Rungiah del. Dwyer, lith.

Cirsium argyracanthum (D.C)

ranges of the south while the other two are confined to the north. The genus generally is of extra tropical origin, Europe, Asia Minor, and North America being the regions in which the species principally abound.

The Neilgherry species is also met with on the Pulney range and I think on the Sherveroy hills, but of that I am not quite certain.

CIRSIUM ARGYRACANTHUM (D. C.) leaves semi-amplexicaul serrately pinnatifid, ciliato-spinulose, the lobes ending in strong spines; beneath and the stem arachnoideo-villous: capitula paniculato-congested: bracteæ many cleft very prickly: scales of the involucrum terminating in strong spines.—*D. C. c. l.* 6. 640.

Very common on the Neilgherries, about equally so on the Pulney mountains. In moist rich soil it not unfrequently attains the height of 6 or 7 feet. It may be met with at most seasons in flower, but is in perfection in August and September. Flowers pale purple.

Tribe Cichoraceæ. *capitula homogamous flowers all ligulate 5-toothed or 5-nerved. Style cylindrical above and, with its more or less elongated somewhat obtuse branches, equally pubescent: the stigmatic series of glands ending about the middle of the Branches no where confluent. Herbaceous, rarely shrubby, milky plants with alternate leaves.*

This is a very distinct and generally most easily recognised tribe and the plants so constant in these floral characters that, once known, it is scarcely possible afterwards to mistake them. To this tribe belongs the well known Lettuce, Sow Thistle, Hawks-weed, Dandelion, Goats'beard, Succory, &c., most of them to be met with on the hills either wild or in gardens. The number of genera referred by DeCandolle to this tribe is 83, some of which, however, it appears to me, might well be dispensed with. Of these 83 genera 11 have species indigenous to India, but on this point I feel some uncertainty exists, as I cannot help thinking that DeCandolle has, while elaborating this last tribe of his great work, fallen into one or two errors which seem to cast a shade of doubt over some other parts of this division. The plant for example, which I have here called *Microrhyncus*, is described under *Lactuca* by D. C. the former having 5 angled beakless achænia the latter having them compressed and abruptly terminating in a filiform beak. Again, I find *Luctuca Heyneana* agrees much better with the character of *Brachyramphus* than with that of *Lactuca* whence I feel disposed to infer that the whole of D. C.'s section "Mycelis" of *Lactuca* would be better placed under *Brachyramphus* which has a short beaked, muricated, achænium in opposition to the long-beaked smooth one of *Lactuca*.

The properties of this tribe are peculiar, the species are all milky and many of them possess well marked narcotic qualities such as the Lettuce and Succory, though not to such extent as to unfit them for esculents when properly cultivated and used young and succulent. In Europe the chicory is cultivated for the sake of its tap roots which are used as a substitute for coffee and are said certainly to improve that most agreeable beverage when properly torrified and mixed in small quantities. The scorzonera and salsafy are also cultivated for their roots, the latter of which especially, furnish a fine flavoured vegetable. Several others enjoy considerable reputation in domestic medicine in Europe, but being unknown in India need not be noticed here.

The two plants selected to illustrate this tribe are referable to two sub-tribes *Lactuceæ* and *Hieracieæ*, the distinction between which is mainly derived from the

pappus which is soft delicately filiform and smooth in the former, while it is somewhat rigid and rough in the latter. The other points of distinction are fluctuating and less to be depended upon, being more or less common to both.

Sub-tribe Lactuceæ *Receptacle epaliaceous or rarely paliaceous : pappus hair-like fugaceous, soft silvery white.*

To this section *Lactuca, Sonchus* and several other nearly allied genera, in addition to the one here represented, belong; the species of the genera *Brachyramphus* and *Youngia* have so much the habit of *Sonchus* that they might easily be mistaken but for the achænia which in this tribe, in many instances, furnish excellent easily detected generic characters, as the following examples will show. *Lactuca* achæn. sublenticular furnished with a filiform beak. *Microrhyncus* achæn. oblong, 5-angled beakless. *Brachyramphus* achæn, muricated short beaked neither angled nor ribbed. *Youngia* achæn beakless longitudinally striated. *Sonchus* achæn. beakless longitudinally ribbed often transversely muriculate between the ribs. *Mulgidium* achæn beaked, beak dilated, saucer-like at the apex.

MICRORHYNCUS.

Capitula several flowered. Achænia 4-rarely 5-angled subrostrate at maturity ; beak wanting in the ovary. Costæ thick subrugose. Pappus pilose.—Herbaceous perennials, involucrum cylindrical, calyculato-imbricate at the base : receptacle naked : flowers yellow.

To this genus DeCandolle assigns only six species three of which are Indian. The one here figured I have added by removing it from the genus *Lactuca* in which he had, perhaps through oversight, erroneously placed it, as it certainly does not belong to that genus. The other three species are natives of the plains, one is common on the sands near the beach all along the Coromandel Coast.

MICRORHYNCUS GLABRA (R. W. *Lactuca glabra* D. C.) glabrous, stem naked, dichotomously branched about equal or a little longer than the leaves ; leaves elongato-linear, somewhat rigid, acute, either entire or dentate : capitula corymbose long pedicelled cylindrical 7-8 flowered : involucrum calyculate with lanceolate squamellæ ; squamæ 5-6 linear lanceolate somewhat scariose on the margin, thrice as long as the calyculus; achænia five angled obscurely beaked.—Denticuli of the leaves sometimes nearly wanting oftener retrose : leaves 2-3 inches long, 2-4 lines broad.—*D. C. l. c.* 7.—135 under *Lactuca*.

Neilgherries rather common to be met with in flower at all seasons but most abundant during the rains from July to December. I have ventured to remove this plant from the genus in which D. C. placed it, as the achænium corresponds accurately with the one and not at all with the other. In *Lactuca* the achænium is flattened and abruptly lengthened into a long filiform beak : in this it is pentangular and scarcely beaked.

Sub-tribe Hieracieæ. *Receptacle epaliaceous : pappus filiform, rigid, fragile, becoming dirty white or yellow.*

Two genera only of this sub-tribe, so far as I can discover, have Indian representatives, which seems curious, as the large genus Hieracium, including nearly 200 species, is to a great extent alpine in its habits, and therefore one which, *a priori*, might be expected at least on the Himalayas, if not further south, but does not as yet appear to have been met with on these mountains. The genus *Mulgedium*, on the other hand, furnishes 7 Indian species out of 23, the total number yet known. Six of these are from the Himalayan range and one, that here represented, from the Neilgherries. All the species are alpine plants.

MULGEDIUM.

Capitula many flowered. Achænia glabrous compressed, often nerved on both sides, attenuated upwards into a beak expanding at the apex into a cup-shaped disk. Pappus one or several series, bristles rigid rough, greygish or white. Erect ramous herbs with pinnatifid leaves and racemose or panicled capitula : involucrum calyculately imbricate, that is, the exterior scales are much shorter and subimbricate, receptate naked, alveolate : flowers blue or purple.

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Microrhynchus (R.) glabra (R.W.)
Leitneria glabra, D.C.

This seems a peculiarly distinct and well marked genus. In habit, it so far agrees with *Sonchus* that the only British species, a very rare Highland plant, has hitherto been referred to that genus. The beaked achænia, however, expanding at the apex into a saucer shaped disk at once distinguishes them. The pappus too is most distinct, in *Sonchus* it is as fine, smooth and fexible as silk, in *Mulgedium* rigid and, as seen under the Microscope, decidedly rough. The purple flowers of the one and the yellow ones of the other are also ready marks of distinction.

MULGEDIUM NEILGHERRENSE (R. W.) stem erect glabrous, somewhat panicled at the apex: cauline leaves runcinately pinnatifid, doubly crenate, dilated and somewhat stemclasping at the base, terminal lobe subrhomboid, attenuated upwards, mucronate, somewhat hairy on both sides, especially on the veins beneath; floral ones entire lanceolate: pedicels hairy at the apex: capitula ovate, scales of the involucrum imbricate, exterior ones hairy on the back: achenia obovate, compressed, winged, ending in a long beak, pappus setaceous rough. Plant from two to four feet high flowers purple.

Neilgherries not unfrequent in jungly ground and by road sides, flowering during rainy and cool seasons.

It is abundant by the road side leading up to Kelso Cottage and also in the wood behind the house down towards the stream. But I have seen it many other places.

LOBELIACEÆ.

This, so far as regards the number of its genera and species, is a rather extensive order, and interesting as forming the nearest point of approach between the isolated Compositæ and the rest of the vegetable kingdom. In the last tribe of Compositæ, *Cichoraceæ*, the flowers are all ligulate, that is, split along one side, the anthers are coherent and the juice is milky. In *Lobeliaceæ*, the coralla is in like manner split along one side, the anthers cohere and the juice is milky. Here the analogy may be said to cease, leaving still one point of great importance, widely at variance, between the two families. In *Compositæ* the ovary is 1 celled with a single erect ovule; in *Lobeliaccæ* it is 2 or 3 celled with numerous ovules attached all over the surface of a large axillary placenta.

It is the peculiarity of the ovary in connection with their very perfect capitulate flowers which isolates *Compositæ* from the rest of the vegetable world. The relationship between *Lobeliaceæ*, *Campanulaceæ*, and some others, and *Compositæ* is remarked upon by all writers on natural affinities of plants, but to me it appears that, at the narrowest part, the straight by which they are separated, is still a broad one. The *Compositæ* in the vegetable world may be compared to New Holland in the terrestrial, an immense continent surrounded by a wide ocean studded with islands, some, such as *Lobeliace* and *Campanulaccæ*, very near, but still distinctly apart. The one celled ovary with a solitary erect ovule combined with perfect epigenous capitulate flowers, so universal in *Compositæ*, is no where else to be met with. *Dipsaccæ* and *Valarianeæ* make as near an approach to the ovary of *Compositæ* as *Lobeliaceæ* do to the flower, but they are different: in them the ovule is pendulous from the apex of the cell, in *Compositæ* it is erect from the base.

Lobeliaceæ are very generally diffused over the earth's surface, but certainly predominate more in the warmer regions bordering the tropics than within that zone. This habit will account for their much greater predominance on the higher ranges of hills in

this country than on the plains, though they are still to be met with, even down to the beach in the Carnatic. The few however that do seek the plains only come to perfection during the cool season and in wet or even marshy soils, being most frequently met with on the banks of Paddyfields. Two extend far north into the arctic regions, one of which, *L. Dortmanna*, as if to shelter itself from the sudden variations of temperature to which the air in these regions is subject, grows under water, except the flower stalk, which rises above during the summer and autumn to flower and ripen its seed. The number of Indian species of the order is not considerable and mostly belong to the genus *Lobelia*, of which I have 7 species appertaining to the Peninsular flora.

The properties of this family are most remarkable. I mentioned above, as one of the points of similarity between the Chicories and Lobelias, that they both abound in milky juice. The properties of these juices are however widly different, that of the Chicories being mildly narcotic and tonic, while that of the Lobelias is excessively acrid and poisonous, destructive even to cattle and horses that eat them, and the mere odour of one of the species is, it is said, so powerfully poisonous, as to cause sickness and vomiting. The economical or medical properties and uses to which our Indian ones may be applied does not seem to have been investigated, as no notice is any where to be found of them. As ornamental objects very many of the family are well worthy the attention of the gardener and I cannot help feeling surprise at their rarity in the flower plots and borders on these Hills.

LOBELIA.

Calyx 5-lobed ; tube obconical ovoid or hemispherical. Corolla longitudinally split along the upper side, bilabiate ; tube cylindrical or funnel shaped straight ; the superior lip often smaller and erect, the inferior usually spreading 3-lobed or rarely 3-toothed. Anthers the two lower ones, or sometimes all, bearded at the apex. Ovary inferior or half superior and sometimes even almost superior.—Herbs or rarely shrubs with alternate leaves usually racemosely spiked flowers, with axillary pedicels, the corolla being blue, or white, or violet, or red and yellow mixed.

This genus, as left by Linnæus, embracing the whole of the order, so far as known to him, only included 27 species. There are now 27 genera, while the single genus *Lobelia* includes upwards of 200 published species and the family of *Lobeliaceæ* about 400. This family affords an interesting example of the rapid extension of our knowledge of the vegetable kingdom in recent times. In 1768 when Linnæus published his 12th edition, the last edited by himself, of the Systema Natur 27 species were known, 80 years after in 1848, the number had increased to 400, an average increase throughout that long period of nearly 5 per annum. Out of that vast number the Indian list scarcely amounts to 20 species, showing how little this family partakes of a tropical character. Five of these 20 are indigenous on the Neilgherries and one of them, *Lobelia excelsa*, perhaps the largest of the genus. There are several yet to be added ; my own collection contains 10 or 11 species, some of which are still unpublished. There is a small cespitose species much cultivated in pots, by amateurs, under the strange name of "Neilgherry grass" I suspect the *Lobelia succulenta* of Blume, a Java plant, but of which I cannot make myself certain, as I have not a specimen to examine. It is procumbent, roots at the joints, and in a short time quite covers the pot with a rich green carpet, variegated with small blue flowers forming a great contrast to the tall ungainly *L. excelsa* of the Hills.

Mulgedium Neilgherrense (R.W.)

Corrindoo, del Dunphy, Lith

Lobelia Tupa (Ruiz)

Lobelia excelsa (Lescher)

1170. LOBELIA TRIGONA. (Roxb.) glabrous, branches diffuse, erect, or ascending and like the stems trigonous: leaves subsessile, ovato-subcordate, repandly dentate, teeth mucronulate: pedicels slender, longer than the leaves, bibractiolate at the base: tube of the calyx obconical, lobes linear, acuminate, about the length of the tube: corolla small, glabrous, longer than the calyx: anthers enclosed, all bearded at the apex: capsule obovoid.—*D. C. Prod.* 7. 360.

In moist pastures on the borders of rice fields frequent, also abundant in swampy grounds on the Neilgherries.

This is usually a low diffuse plant growing amongst grass. Stems weak and succulent, the leaves succulent when growing, but thin and membranous when dry. Flowers pale blue. The habit of the plant is well represented in the drawing.

1173-4. LOBELIA EXCELSA. (Lesch.) stem very large, herbaceous, erect: leaves lanceolate, shortly petioled, narrow at the base, acuminate, denticulate, puberulous above, tomentose beneath: racemes foliaceous pubescent, many flowered: bracts long acuminate, glanduloso-denticulate, twice the length of the pedicels: lobes of the calyx erect, linear-lanceolate, denticulate, thrice the length of the hemispherical tube; equalling the length of the tube of the pubescent corolla.—*D. C. Prod.* 7—381.

Very common on the Neilgherries. A tall, ungainly looking plant, flowering during the rains, from May to September but to be met with in flower at all seasons. The stems are annual but the roots seem perennial. The stems are currently met with from 6 to 8 feet high, but may often be seen from 10 to 12 feet. flowers pale yellowish, tinged with lilac, pubescent, ovary more than half superior.

Many persons seem to have an idea that this is a species of Tobacco, "Hill Tobacco," and have asked by what process of cultivation it becomes the tobacco of commerce. I presume that ere this time the readers of these pages do not require to be told that, no process of cultivation could ever so alter this plant as to convert it into tobacco though, for any thing I know to the contrary, it may greatly resemble that plant in its properties, but that is improbable.

CAMPANULACEÆ.

It is still a subject of discussion among Botanists whether Bell-flowers and Lobelias should be viewed as separate families or sections of one larger group. The question is too abstruse for this book, but it may be remarked in passing, that if properties be allowed to have any weight in deciding the question, it may soon be set at rest as nothing can be more widely distinct. The juice of both is milky, but in this, having a large admixture of mucilaginous matter, it is of the mildest and least irritating quality, while in the other, as already stated, it is in many instances highly acrid, corrosive and poisonous. This, added to certain Botanical distinctions, such as the irregular flowers and united anthers of the one and the regular bell-shaped corollas and free anthers of the other, certainly make out a strong case in favour of their separation.

In regard to its extent, it is nearly on a par with the other, the number of genera, in this being 25 with about 450 species. Like *Lobeliaceæ* it is a pre-eminently extra-tropical family, the Indian members bearing about the same proportion in both, and in either case nearly the whole inhabiting the more elevated alpine regions. It seems curious that they should be found so sparingly on the Himalayas, considering their frequency on the European and Caucasean ranges of Mountains. According to Alphonse DeCandolle "the chain of the Alps, Italy, Greece, Caucasus, and the Altai range are their native country;" the same high authority informs us, the Cape of Good Hope is another centre of habitation, containing not fewer that 63 species; a number considerably increased since he wrote. The properties of this family are of inferior note, much more associating with those of *Cichoraceæ* than *Lobeliaccæ*, the roots of some of them being esculents and formerly esteemed very nourishing and, on account of their milky juices, especially appropriate to lactescent women! As garden ornaments, many species are held in high esteem and very generally

admitted into flower gardens, though I question if any species of the whole family is so generally admired as the delicate and modest Hare-bill of the English pastures, whose unassuming beauty has been so often sung by rural parts. I have never seen a growing specimen of that plant on the Hills, though I feel sure that its introduction and naturalization there is desired by many, as adding another link to the many associations with our native country which these favoured regions already supply. There are no want of Campanulas or Bell-flowers in the Hill gardens, but the true Harebell or Witch's thimbles, of the Scotch peasantry, is not among them.

This family presents one of those beautiful instances of design on the part of the Great Architect, so often passed unheaded by the careless observer, or if noticed, casually denominated "a curious provision of nature" but which cannot be too often or too forcibly dwelt upon by those who would teach the attributes of the Deity, by an exposition of the wisdom and design which meet us at every step in studying his works of creation. As it is simply and clearly explained by Dr. Lindley in the 14 letter of his Lady's Botany I shall extract the passage entire.

"From the base of the corolla, and consequently from the summit of the ovary, spring five stamens, whose filaments are broad, firm and fringed, curving inwards at the base and bending over the top of the ovary, as if to guard it from injury; their points touch the style and keep the anthers parallel and in contact with it till they shirvel up and fall back which happens immediately after the flower unfolds. The style is a taper, stiff column, about the length of the corolla and longer than the stamens. It is covered all over up to the tips of the stigma with stiff hairs which nature has provided to sweep the pollen out of the cell of the anthers as the style passes through them in lengthening. If it were not for this simple but effectual contrivance, as the anthers burst as soon as ever the corolla opens, their pollen would drop out of the nodding flowers and be lost before the stigma was expanded and ready to receive the fertilizing influence; [the hairs of the style catch the pollen and keep it till insects, wind, or accident brush it down upon the inverted stigmas."

Two genera of this order are found on the hills, the one *Wahlenbergia* bearing some resemblance to the Hare-bell of Europe, but very different, the other *Campanula*, of which there are several species, but none of them common.

The order has been divided into two tribes or suborders, namely:

Wahlenbergieæ, with the capsule opening on the vertex, within the circle of the limb of the calyx, and Campanuleæ, with the capsule opening laterally.

The Neilgherry Flora presents examples of both these tribes.

WAHLENBERGIA.

Calyx 3-5 cleft, Corolla 3-4-5 lobed above or more rarely cleft down to the middle, funnel shaped, subcampanulate, or tubular. Stamens 5-3 free, filaments dilated at the base. Style hairy, especially on the upper part. Stigmas 3-5, or 2 at length spreading, usually linear short. Capsule 5-3-2 celled, valves septifer-

Hungrah del. Drumsku lith.

Wahlenbergia agrestis (A.C.D.C).

Govindoo, del. Dumphy, Lith.

Wahlenbergia Indica (al. D.C.)

ous dehiscent at the apex; the cells when 5 opposite the lobes of the calyx. Seeds numerous, minute. Herbaceous annuals, sometimes perennials, or even shrubby, most abundant in the Southern hemisphere, especially about the Cape of Good Hope. Leaves alternate, congested toward the base. Peduncles terminal and axillary, often elongated, forked, Pedicels long slender terminal or leaf opposed; flowers drooping; capsules erect.

This genus, as it now stands in DeCandolle's Prodromus, includes 100 species. only 9 of which are natives of India. Three or probably 4 of these are found in the Peninsula; the remainder are from the Himalayas

1175. WAHLENBERGIA AGERSTIS. (Alph. D. C.) stem erect, ramous from the base, pilose below: lower leaves approximated, narrow linear, nearly entire, undulated on the margin; peduncles usually dichotomous with very short bracts: tube of the calyx glabrous obovoid,shorter than the erect linear narrow lobes: corolla funnel shaped about a twice the length of the lobes of the calyx: capsule obovoid.—*D. C. Prod 7. p.* 434.

Neilgherries frequent, in flower at nearly all seasons, flowers pale blue. I am not quite sure that this is identical with the Nepaul plant or rather, whether I ought not to have viewed this as *W. Indica* rather than the following which is as much less common plant on the hills and is perhaps a new species. If however this is W. Indica, then it seems probable the two species ought to be united, as this corresponds well with the character in all points, except in the station.

1176. WAHLENBERGIA INDICA? (Al. D. C.) stem ramous below and like the leaves pilose: leaves linear entire acuminate: peduncles 1 flowered glabrous: calyx glabrous, tube ovoid, lobes narrow acute: corolla tubular about a half longer than the calyx, capsule obconical.—*D. C. Prod.* 7. 434.

Neilgherries in moist pasture land. In the operation of transfer this figure has been represented too hairy, in the original it was finely pilose. On this account it would probably have been better to have suppressed the figure, but it is hoped this explanation will suffice to correct the error of the existence of which I was not aware until the whole impression had been printed off.

Since the above was printed I have examined several additional specimens and now feel satisfied that different specimens vary in their hairiness and that this is not materially in excess.

CAMPANULA.

Calyx 5-cleft. Corolla slightly 5-lobed or 5-cleft usually campanulate. Stamens 5 free, filaments broad membranaceous at the base. Style during flowering covered, except at the base, with collecting hairs. Stigmas 3 or 5 filiform. Capsule 3-5 celled, valves 3-5 dehiscing laterally. Seed ovate flattened or ovoid. Herbs usually perennial, sometimes low and pressed to the ground sometimes two or three feet high, erect, many flowered, with the cauline leaves often differing from the radical ones. All natives of the northern hemisphere.

This is a very large genus including, with the more recent additions, above 200 species and all from the Northern hemisphere. Alph. D. C. in his monagraph of the order divided it into two sections the one having and the other wanting reflexed appendages in the clifts of the calyx. These primary sections, are further divided according to the number of cells of the capsule the position of the dehiscing pores, &c., all the Indian species belong to the second section "sinus calycis non obtecti, capsula 3 locularis" and the two first of the following species to the sub-section "capsula nutans, pedicellata, valvis adbasin sitis dehiscens." This mode of dihescence by means of valves situated on the sides or near the base of the capsule is peculiar to this genus and readily distinguishes it from all the others of the order. It is thus familiarly explained by Dr. Lindley in the work already quoted, Lady's Botany. "But how are the dust-like seeds to find their way out of this lidless box or penetrate its tough sides? Considering what happens in so many other plants we should naturally expect that it would take place by a separation of the edges of the three carpels into valves, near their points; but upon looking at the top of the ovary between the sepals, we find that part still tougher than its sides and without the slightest appearance of opening. It is by rending the thinnest part of the sides of the fruit in the fork of the three principal ribs that these valves are produced and that nature provides for the escape of the seeds. The rending takes place by the final drying of the sides of the fruit when every part becomes stretched so tight, that any weak portion must of necessity give way. As the stretching takes place with uniformity, and as the skin at the forks is always more tender than any other part, the opening of the valves will consequently occur with the same invariable certainty as the formation of the seeds." The valves thus described are seen in the magnified figures of the capsules in the three species figured, while by the position in which they are placed, another fact is illustrated, namely that in two of them the capsule droops or hangs down at the period of maturity while in the third it remains erect, circumstances which have not been overlooked in grouping the species into sections for facilitating their determination, the two first belonging to the section "Capsula nutans" the third to the one "capsula erecta."

Campanula Alphonsii. (Wall.) decumbent one-flowered : stem pubescent, cauline leaves sessile, sub-lanceolate acute, denticulate, pilose above, incanous beneath : calyx pubescent, divisions acute serrated or sometimes lobed, about half the length of the campanulate puberulous corolla. *D. C. Prod.* 473. (very slightly altered.)

Neilgherries forming dense tufts in clefts of rocks.

The specimen represented is very different from the one described by D. C. though unquestionably the same species ; I have therefore in the character ventured to make one or two slight alterations, but I suspect scarcely enough to give a correct idea of the species.

Campanula ramulosa. (Wall.) stem erect, pilose ramous : leaves lanceolate sessile, crenato-dentate, veins prominent beneath : pedicels axillary and terminal : calyx pilose, lobes broad acute sub-dentate about half the length of the cylindrical villous corolla ; capsule turbinate drooping. *D. C. Prod.* 7. 473.

Neilgherries, in woods and about hedges in shady places. The original specimens of this species were from Nepaul, but so far as character enables me to decide, the Southern plant does not differ.

Campanula fulgens. (Wall.) stem erect, about a foot high, hairy : leaves lanceolate acuminated at both ends, short petioled, serrated : flowers subsessile, axillary solitary or three together, approximated towards the apex : lobes of the calyx subulate erect entire, about the length of the infundibuliform glabrous corolla.—*D. C. Prod.* 7. *p.* 477.

Neilgherries, on grassy slopes and pastures, frequent. I have another form, apparently, of this plant with the flowers congested into a capitulum. Flowering season June and July during the rains, but not confined to that season as it may be found in flower at nearly all seasons. The Neilgherry plant seems to differ from the Bengal one in the calyx, being considerably shorter than the corolla, which leads to the suspicion of its being a distinct species though, from its agreeing so well with the character in other respects, I cannot venture on giving it a new name.

VACCINIACEÆ.—Bilberry-tribe.

Botanists are divided in opinion whether this family ought to be kept distinct or should form a suborder of the Heath-tribe, *Ericaceæ*. The question is not easily answered being one on which much may be said on both sides without leading to conviction on either, such being the case I shall not attempt to discuss it here beyond merely stating that those who insist on keeping them distinct, do so on the ground of the ovary being in this inferior, and the fruit generally a berry, while in *Ericaceæ* the ovary is superior, that is, lodged within the tube of the corolla, and the fruit capsular, opening by valves to give exit to their innumerable dust-like seed. In all other respects they may be said to associate on the most amicable terms, as may be seen from the examples here given.

In regard to this controversy it may perhaps be remarked, en passant, that it would be fortunate if all our orders rested on as satisfactory characters, even though it may well be doubted whether, in the present instance, they are calculated to produce conviction, especially after adverting to the characters of *Lobelia* in which it is said the ovary is inferior or half superior (see *L. exedsa*) or quite superior ; or still better to those of *Rosaceæ* in which both structures are abundantly obvious in its different suborders : or perhaps better than either to *Myrsiniaceæ*, where in the section *Mæseæ*, the flowers are epigynous while the rest of the order has them hypogynous.

The plants composing this order are generally, if not always, trees or shrubs of great beauty, usually with alternate leaves and bell shaped or long tubular flowers in which pink is the predominating colour, though in some they are the purest white, forming lovely clusters on the ends of the branches. None of the Indian ones with which I am acquainted possess this character they, for the most part, having elongated racemes : but some have their flowers solitary from the axils of the leaves. The stamens with few exceptions are included within the tube of the flower and are very curiously formed bodies, especially the anthers. The proper anther, or pollen case, is two celled and opens by pores : these for the most part are surmounted by two long tubes open at the apex and furnished on the back with two bristles. These bristles are not however so constantly present as the horns or tubes. These appendages are so general, that they have procured for the group of orders in which they occur the characteristic name of *Bicornes*. They are found in all the Neilgherry

Runga ad. del.

Trumphy Lith

Campanula alphonsii (Wall)

Govindoo del: Dumphy, Lith

Campanula ramulosa (Wall)

Govindoo, del. Dunphy, Lith.

Campanula fulgens (Wall)

species except Rhododendron, in which they are wanting. In its geographical distribution the family is very decidedly extratropical the northern parts of Europe and especially north America being truly their native country. Many however are also found in south America beyond the tropics inhabiting the elevated valleys of the Andes, as in India they do those of the Himalayas, Neilgherries, Pulnay mountains, Newera Ellia of Ceylon, &c. In upper Assam, in the Khasyah mountains they also greatly abound. There the late Mr. Griffith collected between 20 and 30 species.

The fruit of nearly all possess an agreeable acid, whence many are in daily use as esculents in the northern counties of Europe. The well known Cranberry so famous for tarts belongs to this family and the fruit of the species here figured *V. Leschenaultii*, when fully ripe, makes a very excellent substitute, with the exception of a dash of bitter with which the acid is combined, requiring an additional quantity of sugar to render it equally palatable. With this addition I can safely recommend these berries as a tart fruit, as I have eat many tarts made of them, giving them the preference to some of the preserved fruits of Europe.

Beyond that I am not aware of any use to which either of the hill species has been applied. The following generic character and remarks on the genus *Vaccinium* I republish from my Icones, vol. 4 part 1st, in which I have published figures of 14 species most of them new.

VACCINIUM.

Calyx adherent, limb 4-5 lobed. Corolla tubular 4-5 cleft. Stamens 8-10 epigynous, anthers adnate, 2 celled, often furnished with 2 bristles on the back, the cells ending in a tube open at the apex. Ovary 4-5 celled, placentas ascending, usually, bearing the ovules on the margin. Berry 4-5 celled, often spuriously 10 celled through the adherence of the walls to the thickened placentas. Seed several in each cell, testa coriaceous or somewhat bony : albumen fleshy : embryo orthotropus, radicle next the hilum. Trees, shrubs, &c.

According to this character it is of no moment whether the lobes of the calyx are large or small, whether the corolla is long or short, thick or thin : the anthers may or may not be bristled, but are always expected to have the cells more or less prolonged into tubes, and to have the number of cells of the ovary equal to those of the lobes of the calyx and corolla, with, more or less distinctly, free ascending placentas and a plurality of ovules. Such is the genus *Vaccinium* as understood by me when naming the following and several other still unpublished species in my herbarium.

Dunal, in his monagraph of the Order *Vacciniæ*, retains *Agapetes* and *Thibaudia*, Endlicher, Miesner, and Lindley unite them. Kunth is followed by Miesner in expressing a doubt as to whether *Ceratostema* is distinct from *Thibaudia*, and Hooker states that he " cannot understand what are the essential distinguishing marks between them." Among the following are species which have been referred by different Botanists to *Ceratostema*, *Agapetes*, *Thibaudia*, *Gaylussacia* and *Vaccinium*. To determine among so many genera it became indispensable to examine the characters of all with much care. After the closest scrutiny and careful dissection of the flowers of all the Indian species in my collection side by side with several acknowledged *Vaccinia* from both America and Europe, I found it utterly impossible, from the characters given, to make out more than one genus among the Asiatic ones, the structure being the same in all. By Roxburgh these would perhaps have been all referred to *Ceratostema :* Wallich refers them to *Thibaudia*, while Don and Dunal form the genus *Agapetes* for their reception. Had long tubular flowers been a constant feature, I might on that account, aided by geographical distribution, have followed these authors, and, assuming that as its essential character, kept up their genus. This however is far from being the case, and is therefore, as a generic character, useless. And on turning to Dunal's character of *Vaccinium*, I find the corolla described as " campanulata, urceolata vel cylindrica."

In all the Indian ones it is either urceolate or cylindrical. He describes the stamens as "limbo calycis inserta," which is the case in all the Indian ones I have examined, and the fruit "Bacca calyce vestita globosa 4 aut 5 locularis loculis polyspermis, rarissime 10 locularis loculis monospermis" which, except the last clause, is equally applicable to the fruit of all I have had an opportunity of examining. The ovary, unfortunately, is not referred to in the character of either genus. The concluding clause of the character may perhaps account for Professor Lindley's referring one of the species to *Gaylussacia* which, while that clause remains as part of the character of *Vaccinium*, seems scarcely a distinct genus, the fruit having 10 cells with 1 seed in each being its essentially distinguishing mark. In all other points Dunal's characters of the 2 genera, are nearly word for word the same, and the abortion of all the ovules but 2 in each of the 5 cells converts *Vaccinium* into *Galussacia* and, unless care is bestowed in the examination, even that is not necessary, as a transverse sectiou of a nearly mature fruit almost always presents the appearance of 10 cells with one seed in each, and I feel nearly certain that an examination of the *ovary* will shew that but few of Dunal's 29 species have it 10 celled with a single ovule in each. *G. dependens*, an authentic specimen of which was most obligingly communicated to me by Mr. Gardner of Ceylon, has a 4 celled ovary with numerous ovules and is in fact a species of *Vaccinium* with very short anther tubes.

Whether *Ceratostema* can be kept distinct I am unable to say, but judging from the really essential points of the character, apart from the numerous non-essential ones introduced by Dunal, I think not. *Thibaudia* has one good distinguishing mark in the union of the filaments between themselves and their attachment to the base of the corolla. But if that is to be taken as the essential character of the genus, then both *Macleanea* and *Anthopterus* should be associated as subgenera, the collateral marks derived from the calyx and corolla being scarcely of generic value in a family where these organs are so variable.

Influenced by such considerations, I have without hesitation referred all the Indian species to *Vaccinium* with the sub-generic appellation *Agapetes* to mark their Asiatic orgin.

VACCINIUM (A) LESCHENAULTII (R. W. *V. arboreum* Lesch. not Michx. *Agapetis arborea* Dun in D. C. Prod. *Andromeda symplocifolia* Wall. L. No. 1522,) arboreous older branches glabrous, greyish white, ramuli pubescenti-villous: leaves shortly petioled, ovato-elliptic, serrated, acute, paler beneath, hairy on the costa: racemes axillary and terminal, about the length of the leaves.

Neilgherries, frequent, flowering March and April, but usually to be met with in different situations in flower and fruit at all seasons. The berries which are about the size of red currants are agreeably acid and make excellent tarts, much resembling in taste those made with the cranberryus. *Oxycoc palustris* or *O. macrocarpus.*

1189. VACCINIUM (A) NEILGHERRENSE (R. W.) shrubby, glabrous, except the pubescent young shoots and leaves: leaves lanceolate, acute at the base, acuminate at the point, racemes longer than the leaves, axillary, usually confined to the extremities of the branches: flowers whitish or rose coloured, short pedicelled, usually furnished with a large foliaceous bractea: corolla ovate, slightly pubescent: filaments hairy anthers bristled' tubes dilated towards the apex.

On the low banks of streams Neilgherries: abundant along the banks of the Pycarrah river for a mile or two above and below the Bungalow. Flowering during the dry season, from February till April. It is nearly allied by its technical characters to the former, but is evidently quite distinct. The large foliaceous bracts supplies the best distinguishing mark, but both, in habit and locality it differs. Flowers usually white and smaller than those of the preceding, smaller, even than those of the specimen selected for representation.

ERICACEÆ.—HEATH-TRIBE.

An extremely beautiful family of plants and most deservedly reputed among the greatest favourites of the lovers of fine flowers, a commendation more especially applicable to the genus *Erica* (the true Heath) from which the family derives its name. It is unnecessary to give any general description of the family here, as that would be nearly to repeat what has bsen already said under *Vacciniaceæ*, in every thing except the position of the ovary, which, in this, is superior or lodged within the tube of the corolla, while in that, the corolla is seated on the top of the ovary. The fruit also differs; in this it is for the most part dry and capsular, either opening at maturity by the edges of the carpels, or along the divisions of the seed vessel, into as many valves as there are cells in the ovary, or more frequently, along the middle of the cells, leaving the partition adhering to the middle of the valve; while in Vaccinium it is an indehiscent berry with fewer seed and these lodged in pulpy cells.

Gerrindo, del. Drumphy, Lith.

Vaccinium agapetes Lechenaultii (R.W.)
V. arboreum (Lesch.-mot inscr.)

Govindoo, del.

Vaccinium (Agapetes Neilgherrense) K. W.

The genus *Gaultheria* is an intermediate form, or sort of half way house between them; the ovary is at first superior and the mature seed are the small dust-like forms met with in the rest of the family, but the calyx grows with the growth of the seed vessel and by the time it has attained maturity has covered it with a thick pulpy coat giving it quite a berry like appearance which, until dissected, might easily be mistaken for a true berry and mislead the observer as to the family to which, it belongs. The same may, to some extent, be said of the strawberry tree, *Arbutus*, though from a different cause, the thickening namely of the seedvessel itself, changing the fruit from a capsule into a sort of berry or Nuculanium which, unless carefully looked to, might easily pass for a true one, which, however, differs in being usually inferior or enclosed within the tube of a fleshy calyx.

The family very naturally divides itself into four tribes or suborders easily defined and differing so far in habit as to be generally readily recognized, namely ARBUTEÆ with indehiscent berried fruit and deciduous corolla. ANDROMEDEÆ fruit capsular opening along the middle of the cells, (loculicidal) corolla deciduous, buds always scaly. ERICEÆ fruit capsular loculicidal, or rarely septicidal, corolla withering on the stalk (not deciduous) buds without scales. RHODOREÆ fruit capsular splitting along the partitions (septicidal) corolla deciduous often deeply cleft, flower buds usually scaly. The two Neilgherry species belong to the second and last of these tribes *Gaultheria* being Andromedious and *Rhododendron* of course Rhodoreous. These two tribes with *Arbuteæ* are principally confined to the northern hemisphere and abound in Europe and North America, while Southern Africa is truly the native country of the true *Ericeæ*: a small portion only of the vast genus *Erica* being indiginous to countries north of the line.

In regard to properties, this family may almost be passed over in silence, not but that some of its members possess them and in considerable energy, but because they are not such as can, in this country at least, be rendered available to the wants of mankind, except as objects of great beauty, pleasing to the senses and furnishing fine subjects for the flower garden and shrubbery.

GAULTHERIA.

Calyx 5 lobed, afterwards enlarging becoming more or less baccate and enclosing the capsule. Corolla ovate, mouth often contracted 5 toothed. Stamens 10 included, filaments often villous: anthers 4 awned, namely, each cell biaristate rarely muticous. Ovary 5 celled free, embraced at the base by 10 hypogynous scales, placentæ ascending; style filiform; stigma obtuse, more or less lobed at the apex. Capsule globose, depressed, 5 celled, 5 furrowed, 5 valved, dehiscing loculicidally, the valves bearing the partitions. Seed numerous minute, testa reticulate. Evergreen shrubs or small trees natives of America and India. Leaves alternate, dentate or entire. Pedicels axillary one flowered or racemose, furnished at the apex with two bractioles. Corolla white, rose coloured, or scarlet.

In this character there is no allusion to the occasional partial abortion of the stamens shown in figures 4 and 5 of the accompanying plate.

This fine genus is one of considerable extent about 50 species being already described. Its essential character is the fleshy calyx and consequent spuriously baccate fruit. This can only with certainty be made out in specimens with fruit far advanced towards maturity which may, perhaps, account for Sir W. Horker referring our species to *Andromeda* and D. C. doubtfully to *Leucothæ* in neither of which that character exists, both indeed, in the estimation of Endlesher, forming but one genus, the grounds of separation not being, in his opinion, of more than sectional value.

GAULTHERIA LESCHENAULTII (D. C. *G. ovalifolia* Wall. List No. 1523. *Andromeda Katagherensis*, Hook Icon. 246. *Leucothæ Katagherensis*. D. C. Prod. 7, p. 606 *Andromeda flexuosa !* Moon) glabrous, ramuli subtrigonous : leaves petioled ovate or obovate, terminating in a gland, crenulate, punctuate beneath : racemes axiliary or lateral pubescent, a little shorter than the leaves, erect : bracts concave acute glabrous, one under the pedicel, two near the flower. D. C. Prod. 7—593.

Neilgherries, abundant and to be met with in flower at all seasons. It is a considerable sized ramous shrub with every thick coriacious leaves and pure white flowers. Berries blue.

I have adopted DeCandolle's specific name, in preference to Wallich's having a specific character attached : on the same grounds Hooker's specific name held priority had he correctly recognized the genus. It seems curious that D. C. should have overlooked the indenity of Hooker's plant with his own, as the figure is most characteristic, especially when aided, as it is, by a good character and description. The oldest name is undoubtedly Moon's, but he also referred it to a wrong genius.

RHODODENDRON.

Calyx 5 parted. Corolla funnel shaped rarely campanulate or rotate sometimes regular sometimes more or less irregular always 5 lobed. Stamens 10 (rarely 6-9 by abortion), not adnate to the corolla, situated before and between the lobes, usually declinate, exserted. Anthers opening by two terminal pores. Capsules 5-celled and 5-valved, or 10-celled and 10-valved dehiscing along the partetions. Seed, attached to an angled columnar axis, compressed, dust-like, subulate.—Shrubs or trees : leaves evergreen petioled entire : flowers disposed in termenal corymbs : the flower buds scaly : corolla conspicuous, purple white or yellow.

This character which is copied from DeCandolles Prodromus, will now require to be somewhat modified to admit two new species I have recently published in my Icones. In one the calyx and corolla are 8 lobed with 16 stamens and a 16 celled ovary. Here the relation is preserved only differing in number. In the other the calyx is entre with a free somewhat undulated or crenate limb, the corolla 5 lobed, stamens 15 and the ovary 10 celled, but the forms of the anthers, style, and stigma; the structure and position of the placentæ and ovules all agree with those of the other speices.

Whether the altered relations in regard the number of parts of the flower, added to a racemose tendency in the infloresence entitles this last species to become the type of a new genus, my limited acquaintance with the genus Rhododendron does not enable me to determine, though such seems not improbable if my analysis prove correct, of which I feel some doubt, as the specimen had suffered from the attacks of insects. The placentation of this genus, if not indeed of the order, is peculiar. The ovuliferous margins of the carpellary leaf do not, as in most others with axillary placentæ, coalesce and form a central fleshy placenta, but are inflexed remaining free, each margin bearing a row of ovules. The draughtsman not observing that peculiarity of structure has conveyed a most erronious idea of the structure of the ovary in his transverse section figure 5.

The genus is a large one including, according to DeCandolles list, 44 species, and some have since been added ; these are all natives of the northern hemisphere inhabiting the colder regions of Europe, America and Asia, several are found on the Himalayas and on the mountains of Java. I have one from Malacca and the accompanying is common to the Neilgherries and Nucera Ellia in Ceylon. Many of the species are very handsome and prized as ornaments in the shrubbery.

Little seems known regarding their properties, two or three are employed medicinally in Europe on account of the tonic and somewhat narcotic qualities they are known to possess but their use seems limited to domestic medicine.

RHODODENDRON ARBOREUM. (Smith.) arboreous, leaves lanceolate, glabrous, scaly beneath : flowers compact corymbose : ovary pubescenti-tomentose 8-10 celled. *D. C. Prod.* 7—720.

Neilgherries, very frequent. Flowering in great perfection in March and April. Leaves rusty coloured beneath, flowers deep crimson. The tree itself, apparently, from usually growing in exposed situations, has a gnarled stunted appearance ; its compact capitula of flowers are always terminal.

Vaccinium Leschenaultii (B.C.)

Govindoo del. Dumphy, Lith.

Rhododendron arboreum (Smith)
var. B roseum (Lindley)

PRIMULACEÆ—Primrose-tribe.

This tribe to which the Primrose, Oxlip, Cowslip, Auricula Lousestrife and Pimpernel belong, furnishes but few species to the hill flora, three only, so far as I am aware, having yet been found indigenous on them and these not those endeared to us by early associations through the delight experienced in our juvenile days on beholding, in early spring, sunny banks bedecked with tufts of fragrant yellow flowers when all around was still held in the cold deadly grasp of winter. Two of ours belong to the Lousestrife family (Lysimachia) and the other is a Pimpernel (Anagallis) or "poor man's weather glass" as it is sometimes called in allusion to its only opening its flowers during fair weather and closing them on the approach of rain. In Europe these genera are found on the plains flowering about Midsummer, while the Cowslips and Primroses are either natives of the cold mountain tops or flower in early spring. To this circumstance perhaps may be attributed the fact of the summer forms only extending to our southern mountains, while the spring ones frequent the more northern and colder Himalayas.

The flowers of this tribe are remarkable on account of the position of their stamens with regard to the lobes of the corolla. It may here be mentioned that a monopetalous corolla is assumed to consist of as many petals combined into one as there are lobes, hence that the corolla of the primrose which has five lobes is composed of 5 petals. It may further be observed that in perfectly regular flowers, having double the number of stamens that there are petals, that the first or outer row are alternate with the petals and the second or inner opposite to them. In *Primulaceæ* the stamens are always opposite to the lobes of the corolla not placed between them. This is important as indicating a great irregularity in the flower which is attributed to the total suppression of the outer row of stamens. This remarkable peculiarity is only known to occur in three families of exogenous plants *Primulaceæ, Myrsineaceæ* and *Plumbagineæ*. The two first are so closely associated as only to be distinguished by habit, the former being always herbaceous with capsular fruit the latter shrubby or arboreous with drupaceous fruit. These characters can scarcely be admitted to be of ordinal value, hence, by rights, the two orders should be united and reduced to the rank of suborders. But as no inconvenience in practice results from their separation all systematic writers seem disposed to leave well alone and let them remain as they are.

Another peculiarity of this family is found in the ovary and capsule but is not well brought out in the accompanying dissections, which is, that it consists of a single cell with a free central placenta covered on all sides with ovules which lie flat on its surface. The cause of this is, according to Dr. Lindley, ascertained by dissecting the ovary when very young, long before the expansion of the flower, when it is found to be 5 celled but the slender partitions break and disappear before the flower opens leaving the otherwise very inexplicable appearance designated a " free central placenta." The same it is said, is found exist in *Myrsineaceæ* but I have not succeeded in verifying the observation in either case.

This family is greatly prized by florists on account of the extreme beauty and fragrance of their flowers, and as being the earliest harbingers of spring, a distinction

well merited by their bright rich colouring and modest look and early blooming. Some of them possess properties of considerable activity but which it is unnecessary to notice here.

LYSIMACHIA.

Calyx 5 parted Corolla 5 parted subrotate or campanulate longer than the calyx. Stamens 5 inserted into the base of the corolla: filaments sometimes united at the base; sometimes as many sterile filaments, as fertile ones. Anthers oblong. Capsule globose, 5-10 valved, dehiscing at the apex, many seeded. Herbs, usually perennial: leaves alternate opposite or verticelled entire: flowers axillary racemose, spicate or panicled.

This genus, of which there are now nearly 50 species known, is principally confined to the more temperate regions of the northern hemisphere. Only 10 species were however known to Linnæus, showing that the European proportion of species is not so great as might be supposed. It is in truth a widely distributed genus in proportion to the number of its species Europe, Asia Minor, India, Ceylon, China, Japan, New Holland, Cape of Good Hope and North and South America all claim representatives. Like the Neilgherries, Ceylon claims two species both I think distinct from ours though one is certainly very near our yellow flowered *L. deltoidea*. They are not generally I believe much thought of as garden ornaments, though some of them are not devoid of beauty, as the one here given testifies, but, so far as I am acquainted with the genus, this is a favourable example. It is somewhat remarkable that, though always found in its wild state growing in wet marshy ground, it bears transfer to the garden and seems to thrive to the full as well as there in dry soil as in its native marshes.

LYSIMACHIA (EPHEMEDRUM) LESCHENAULTII (Dubyin D. C. Prod. V. 8.) erect, ramous, leaves opposite or ternate lanceolate, sinuate (?) entire, acuminate, glabrous, short petioled: flowers racemose crowded: bractioles linear subulate, acuminated, much shorter than the pedicels: calyx much shorter than the companulate corolla, divisions linear lanceolate acuminate, lobes of the corolla obovate obtuse, entire: stamens equal exserted: style filiform. D. C. Prod.

Neilgherries, frequent in low moist or even marshy soils and generally to be met with in flower. Plant herbaceous perennial from two to three feet in height. Flowers on first opening reddish-white, streaked with darker lines afterwards acquiring a rather deep lylac tinge.

ANAGALLIS.

Calyx 5 parted. Corolla rotate deciduous deeply 5 parted, lobes broad obtuse. Stamens 5 inserted into the bottom of the corolla, free or, rarely, more or less united at the base, filaments bearded. Anthers attached by the back near the base, more or less nodding, introrse. Capsule globose circumcise membranaceous, seeds numerous angular immersed in a central placenta. Herbaceous or rarely suffrutiscent plants: leaves opposite or alternate: peduncles axillary solitary.

Of this pretty and interesting genus 11 species only are known and it may well be doubted whether they all deserve being retained as species. They are, if we may so say, a wandering race and almost always to be found in cornfields where European grain is cultivated. It is I suspect through that medium we are indebted for the very pretty one here figured which is sufficiently frequent about Kotegherry where Wheat and Barley are pretty extensively cultivated. Such being the habit of the family it seems more than probable that the same species has, under the influence of changing climate, run into varieties of sufficient permanence to lead to their being considered so many distinct species. Linnæus described 5 species, the accompanying being one of them, which therefore must have found its way from Europe, most likely with grain-seed. But, however it may have come, it is now thoroughly at home now on the Neilgherries.

Lysimachia (E) Leschenaultii (Duby)

Govindoo del.

Anagallis latifolia (Linn)

ANAGALLIS LATIFOLIA (LINN) roots herbaceous : decumbent, ramous : branches elongated, 4 sided, slightly winged : leaves opposite or ternate broad ovate, semiamplexicaul, subacute, spreading : pedúncles longer than the leaves : calyx a little shorter than the corolla, lobes narrow linear-lanceolate acuminate : corolla nearly twice as long as the stamens, lobes obovate obtuse, finely serrulate : filaments hairy : capsule about the length of the calyx. *D. C. Prod.*

Neilgherries, in corn fields and other cultivated lands : flowers blue.

Duby asks is this a genuine species ? The question is not easily answered but so far as my slender acquaintance with *A. arvensis* enables me to judge, I confess I feel disposed to answer in the negative, though, on slightly comparing my Neilgherry specimens with European ones of *A. arvensis* there does appear some difference. This more nearly approaches the variety *A. cærulea*, if indeed it is not that very plant, of which however I have not a good specimen to compare. The Indian plant is much more **luxuriant than the European.**

MYRSINEACEÆ.

As already stated under Primulaceæ this order is but a section of that, in so far as orders rest on the structure of the organs of fructification ; *Myrsineaceæ* having, like *Primulaceæ*, an inferior calyx and corolla, the stamens attached to the middle of the lobes, not alternate with them, and a free central Placenta covered with ovules. In habit they differ widely, *Primulaceæ* being generally herbaceous with capsular fruit, *Myrsineaceæ* shrubby or arboreous with drupaceous fruit. In this family, as in several others, we meet with two of those departures from the usual structure which are ever crossing the path of the systematist, to the material disturbance and derangement of his arrangements, as if to keep constantly reminding him, that nature will not submit to the trammels of human systems but will have her own way in forming family ties and relationships between families apparently widely separated. The character of this order is to have the ovary free with numerous ovules and the mature fruit, through the abortion of all the ovules but one, with a single full grown seed. In *Mæsa* the ovary is inferior, that is, enclosed within the tube of the calyx and the berry contains many seed : and in *Embelia* and *Samara* the corolla is polypetalous, or in other words the petals of which it is composed have departed **from the character of the family by remaining uncombined.**

The inferior fruit of *Mæsa* places that genus in more or less intimate connexion with a whole group of orders having epigynous flowers while it is still retained among its more immediate relations by the position of its stamens opposite the lobes of the corolla and by its free central placenta. The polypetalous flowers of *Embelia* and *Samara* again bring them into connection with another set of families having polypetalous flowers, but here again the stronger ties of stamen bearing petals and free central placenta overcome the weaker ones of non-cohering petals and retain it among the Primulaceous group.

Looking back to the remarks made under *Vacciniaceæ* which Dr. Lindley has removed from the Epigynous to the Hypogynous group we can scarcely help feeling surprised that this section is passed unnoticed by him though open to the same objections.

This family which now includes about 320 species was all but unknown to Linnæus, two species only being described by him namely *Samara læta* and *Myrsinæ Africana*. Of the credit of having detected and well defined the former of these genera he had very nearly been deprived, though nothing can be more precise than his character. The circumstance of course does not originate in any wish to deprive him of the merit

which is his due, but arose from the circumstance of his having loosely quoted a figure which he thought belonged to the species which he was describing from specimens in hand, but which in truth belonged to a totally different plant, as has since been discovered, and because he quoted the plant figured, under a wrong name, it has been assumed that it was his plant (though totally different) and his genus altogether suppressed and a new one set up in its place.

Dr. Arnott when recently in London and having an opportunity of examining Linnæus' original specimen, was enabled to trace the history of the error through its whole course and restore the Linnæan *Samara* to its place in the Botanical system, but to the exclusion of Alph. D. C.'s *Choripetalum* which is in fact identical with the older genus.

This family is widely but very unequally distributed, apparently, preferring those countries enjoying a rather high but equable temperature. They most abound in the Islands of the Indian Archipelago, next to which ranks Bengal, Burmah, and the Tenasseram Coast. The Indian Peninsula and Ceylon are placed low in the scale, whether owing to these possessing fewer in proportion, or to their being less known, I am unable to say, but I do know that I have nearly twice as many in my own collection as D. C. assigned to both countries in 1833, when his very excellent paper was read to the Linnæan Society.

MÆSA.

Calyx bibractiolate, 5-lobed, œstivation quincuncial, 2 exterior, 3 interior. Coralla 5-cleft subcam panulate, lobes obtuse : in æstivasion one lobe exterior another interior, the three middle ones imbricately convolute on the margins, all obtuse inflexed on the margin. Stamens 5, free, incluse, filaments filiform. Anthus ovoid sperical, cordate, shorter than the filaments. Pollen (dry) ellipsoid. Ovary adnate to the calyx sometimes half superior in the flower, the placenta at the base within the tube of the calyx. Style short. Stigma capitate often obsolately 3-4-5-lobed : sometimes the lobes 5, distinct, opposite the lobes of the calyx. Berry covered by the calyx, ovoid. Ovules numerous immersed in depressions of the central placenta. Seeds numerous, turbinate, angled, flattened above. Embryo cylindrical, the commissure of the colyledous towards the hilum.—Shrubs or trees of Asia or Africa usually hermaphrodite : leaves alternate sometimes pellucido-punctuate : racemes axillary or terminal simple or compound at the base : flowers small white : bracts at the base of the pedicels persistent minute narrower than the bractiols : bractiols addressed to the flower. The essential character of this genus is simply; Corolla superior 5-lobed. Stamens 5 opposite the lobes of the corolla. Ovary 1-celled with numerous ovules attached to a free central placenta. Fruit baccate many seeded.

The genus was published in 1775, under the name here given and again in 1776, under that of *Bæobotris* and, for a long time, both were retained, until at length it was ascertained they were the same, when of course the older of the two took precedence. This will explain the cause of its appearing in Roxburgh's Flora Indica under the latter, he not being aware of the other belonging to the same plants. It now includes about 30 species, 24 of which are natives of India, the Eastern Islands and China, the rest are of African origin. The admitted species seem to me to run so much into each other, that I greatly doubt whether a more extended and intimate acquaintance will not tend to reduce the number, some of them appearing to be varieties taken up from imperfect specimens, of other species. Indeed I can scarcely help thinking that varieties of the species here given form the basis of several of those defined by Alph. D. C. but of that I cannot feel certain without authentic specimens to compare with it.

Govindoo, del.

Maesa Indica (Alph D.C.)

Gouraudon del. Dumphy, Lith.

Embelia Gardneriana (R. W.)

MŒSA INDICA (Alph. D. C.) : leaves ovato-elliptic acuminate, coarsely dentate, membranaceous, subrevolute on the margin : racemes axiliary and terminal, simple or ramous at the base, glabrous, twice the length of the petiole : bracts lanceolate acuminate, shorter than the pedicel, bracteoles ovate acute : lobes of the calyx ovate subciliate : corolla 5 cleft, 3 times the size of the calyx, lobes obovate subciliate spreading : ovary semisuperior stigma capitate sublobate.—*D. C. Prod.* 8. 80.

Alpine jungles in various parts of the peninsula, on the Eastern slopes of the Neilgherries rather frequent. Between this and *M Perrotettiana* I can discover no satisfactory difference. This may indeed be that plant as it grew on the Neilgherries, but I have numerous specimens from other localities which seem all, with but slight variations, to correspond with it. I have therefore adopted the older name though I suspect the newer might have been safely given. The genus indeed seems a very difficult one, different specimens varying in appearance but scarcely affording specific marks of distinction.

EMBELIA.

Calyx 5-parted or deeply cleft. Petals 5-reflexed quincuncial in æstivation, 2 exterior and 3 interior. Stamens 5, filaments united with the base of the opposite petal. Anthers ovoid emarginate at the base and sometimes at the apex, 2-celled, dehiscing longitudinally. Pollen (dry) ovoid furrowed. Ovary ovoid often most minute. Style short : stigma incluse, capitate, sublobate. Ovula 4-1, often abortive, inserted on a central placenta, often most minute. Drupa globose. Seed solitary not filling the cavity of the pericarp. Scandent trees or shrubs : leaves alternate usually entire, petiols often marginate or denticulate. Flowers racemosely panicled or racemose or rarely subcapetate : Flowers small, occasionally, by abortion of the pollen or ovules, sub-dioicous : petals approximated at the base spreading or reflexed.

Of this genus there are 25 species, more or less perfectly known, natives of India, the Eastern Islands and the Madagascar group. It may be said to have been unknown to Linnæus, for, although he saw and partly described one species, he never characterized and named it as the type of a genus.

That species is found in Ceylon and also in the Tenasserim Provinces, one very like it is abundant about Coonoor, so like indeed that for a long time I considered the two identical, which however is not the case. The habit of the accompanying species is so unlike that of all the others I have seen, that it seems not impossible more intimate acquaintance may lead to its removal from the genus, though that does not seem probable. In the mean time it may be viewed as a very distinct and well marked species quite different from all the other Indian ones.

EMBELIA GARDNERIANA (R. W.) : young branches and petioles ferrugeneo-hirsate : leaves ovate, rounded at the base, crenulato-serrated, coriaceous, glabrous, except the sparingly hairy costa, reticulately veined : peduncles axillary short, ferrugineo tomentose : racemes capitulate : pedicels about as long as the peduncles, glabrous : calyx much shorter than the glabrous corolla : petals obovate obtuse longer than the stamens, sprinkled with purplish coloured spots.

Sisparh on the western slopes of the Neilgherries in clumps of jungle, rare. Flowering February and March.

A diffuse shrub, remarkable in the genus for the venation of the leaves which, when dry, form quite a net work of white lines. In habit it associates with *Samara* but its quinary flowers seems to keep it distinct. I have dedicated this very distinct species to Mr. Gardner of Ceylon, who accompanied me when it was found and gathered the first flowering specimens. Thro' an oversight of the draftsman the branches are represented glabrous in place of clothed with short hairs.

SAMARA LINN. *(Choripetalum Alph. D.C.)*

Calyx 4-cleft lobes acute. Petals 4-spreading or reflexed afterwards separately deciduous ; æstivation valvate (in S. auranteacum, imbricate, according to Wallich, in S. undulatum) stamens 4-adnate to the base of the petals. Anthers 2-celled lanceolate ovoid cordate at the base. Pollen (in S. aurantiacum) very minute, spherical marked with lines on the surface. Ovary ovoid conical often depressed and abortive. Style short, stigma capitate subinfundibuliform rugous or subbilobate. Placenta globose, ovules few immersed over the upper part of the placenta. Seed indusiate, globose concave at the base. Scandent shrubs, branches glabrous diffuse : leaves glabrous punctuate petioled : racemes axillary slender simple. Habit of Embelia.

The above with one or two slight alterations is taken, from D. C.'s Prodromus, being his character of

Choripetalum. The following character of *Samara* I take from Linnæus' genera Plantarum which will, I think, bear me out in adopting Dr. Arnott's opinion as to the identity of the two genera.

Calyx minute 4-parted acute persistent. Corolla 4-petals ovate sessile with a longitudinal furrow at the base. Stamens 4, filaments long subulate immersed in the furrow. Anthers subcordate. Pistil. Germen ovate half the length of the coralla, ending in a cylindrical style. Stigma funnel shaped. Pericarp a round drupe. Seed solitary. His essential character is—Calyx 4-parted, Corolla 4-petaled, Stamens immersed in the base of the petals, Stigma infundibuliform. Both these embrace all the essentials of a precise Botanical generic character as perfectly as all those embodied in Alph. DeCandolle's more extended one, and prove clearly enough that he truly had a genuine species before him, when he constructed his character of the genus and not Memecylon as D. C.'s remark under *Myrsinæ læta* would lead us to suppose.

Our plant must therefore revert to the older generic name since it perfectly agrees with the Linnæan character so far as it goes ; and, perhaps, along with it, two species described by Roxburgh under the name of *Samara*, one from the Circars the other from the Moluccas, which D. C. does not seem to have taken up, as I cannot find any notice of them in any of his Monagraphs, of the order.

The genus is a small one, but will probably be found more extensive than is now surmised, as there is room to suspect that one, at least, and probably more, may be found referred to the genus *Myrsine* which it, in some respects, resembles, being principally distinguished by its quaternary not quinary flowers, the flowers in Myrsine being occasionally so deeply parted as to become almost polypetalous. I think I have observed in this, as well as in *Embelia*, that when they flower at irregular seasons nearly all the flowers are imperfect and sterile, while at other seasons, nearly every flower (judging from the quantities of fruit produced) seems fertile. The polygamous tendency therefore adverted to by DeCandolle in both characters is, perhaps, not owing to some plants being uniformly sterile and others fertile, as the same plants seem to me to be both at different times. My opportunities however, for close observation have not been such as to enable me to assure myself of the existence of this curious anomaly, still less to assure myself of the seasons at which they respectively occur. The same thing, it strikes me, also occurs in both the species of *Ilix* found at Ootacamund. The specimen of *Samara*, here represented, seems either taken from a male plant or to have been gathered during the sterile season, which I think is the cold one immediately after the rains, as all the flowers seem deficient in the ovary, those that flower in spring are I think fertile. They flower at both seasons.

SAMARA AURANTIACA (R W. *Choripetalum aurantiacum* Alph. D. C.) leaves ovate-lanceolate, subacute at both ends, entire, coriaceous, long petioled : racemes much shorter than the leaves, longer than the petiols, bracts acuminate as long as the pedicels : petals linear lanceolate reflexed : filaments longer than the petals, much longer than the anthers.—*D. C. Prod.*

Neilgherries also Malabar, flowering during the dry season. When in full flower the branches are quite covered with the numerous racemes of bright orange coloured flowers. The leaves vary considerably in size, being from three to six inches long by from 1½ to 2 broad, usually ending in a blunt acumen.

MYRSINE.

Flowers polygamo-dioicous quaternary or quinary. Calyx 4-5-cleft. Corolla 4-5-parted. Stamens free, filaments inserted into the base of the corolla. Anthers 2-celled erect lanceolate glanduloso-acute, dehiscing longitudinally. Pollen (dry) sperical. Ovary globose, style cylindrical, stigma capitate papillose, irregularly lobed or fimbriated. Placenta sperical depressed at the apex. Ovules 4 or 5 peltate, amphitropous. Drupe pea-shaped, putamen crustaceous. Seed solitary.—Shrubs or trees, with alternate coriaceous leaves ; axillary fascicled flowers ; imbricating caducous bracts : flowers often 4 or 5 androus, in the same plant, small : male ones larger : stigma in the female flowers sometimes large, coloured.

This is a large genus of which Alph. D. C. enumerates 75, more or less perfectly known, species. Sixty one of these, sufficiently well described to be considered known, are about equally divided between the old and new worlds, 31 belonging to the latter. They are mostly of tropical origin but in India, so far as I am aware, seek the cooler climates of Alpine regions.

Guvindoo, del.

Chaetetalum aurantiacum (Alph D.C)

Govindoo del

. Myrsine capitellata; Wall;

Ardisia humilis (Vahl.)

A. DeCandolle seems to have experienced considerable difficulty in finding natural sections into which to group allied species and suggests that, perhaps, the æstivation of the calyx and corolla might be taken for that purpose. So far as I can make out, I should doubt their yielding good characters, the amount of variation being so small that I confess I should feel almost disposed to put all mine down as valvate the accompanying among the rest, though its æstivation is certainly imbricate, the very edges only of the petals being over lapping. The genus, so far at least as the Indian species are concerned, is very unassuming in its aspect and is therefore very little known except to Botanists.

MYRSINE CAPITELLATA. (Wall.) leaves, elliptico-obovate entire, coriaceous, glabrous, narrowing into the petiol : fascicles numerous, 5-8 flowered bractiate : bracts imbricated, ovate : flowers short pedicelled; teeth of the calyx ciliate ; lobes of the corolla lanceolate acute, two or three times longer than the calyx, exceeding the stamens.—*D. C. Prod.* 8—95.

Leaves 4-6 inches long, acute or obtuse, everywhere punctuate, those of the margin longer—flowers polygamous, the fascicles, owing to the imbricating bracts, resembling small cones. Nepaul.

β grandiflora, leaves smaller, lobes of the corolla 4 times longer than the teeth of calyx, Neilgherries, *D. C. l. c.*

Ootacamund, frequent in clumps of jungle, flowering February and March, when the naked branches, below the leaves, are quite covered with its numerous compact capitula of flowers, an appearance which the artist has not been successful in representing. The branch in fruit conveys a better idea of its appearance in that stage.

ARDISIA.

Calyx 5 parted. Corolla 5 parted or 5 cleft, the lobes spreading or reflexed; æstivation of both tending towards the left. Stamens 5 inserted into the base of the tube of the corolla: filaments free, usually short: anthers free erect, emarginate or bifid at the base; often triangular, acuminate: cells dehiscing longitudinally. Ovary rounded 1 celled: style filiform subulate at the apex; placenta central spherical: ovules numerous. 6-12, peltate. Drupe globose, externally fleshy, usually glabrous, coriaceous, hard within, seed one. Trees shrubs or undershrubs : leaves alternate, rarely opposite or ternate, punctuate, entire or serrated : flowers paniculed or rarely racemose, peduncles terminal or axillary, pedicels usually umbellulate at the points of the peduncles : corolla white or rose coloured, often punctuate, drupes usually purple.

This is an extensive genus, 91 sufficiently known species being enumerated in D. C.'s Prodromus, exclusive of 20 regarding which some uncertainty prevails. It is generally tropical in its habits and is nearly equally divided between India and tropical America the predominance, in the number of species, leaning towards Asia. The accompanying is the only species I have met with on the Hills, and it does not ascend above 5000 or 5,500 feet, showing how little this family is disposed to encounter the cold of the more elevated Alpine regions, while at the same time they are peculiarly attached to subalpine stations. I have several from the Hills about Courtallum and Ceylon in both of which stations they enjoy an equable and moist climate. Many of them are exceedingly handsome shrubs, the one here figured not the least favoured in that respect. It prefers shady jungles in moist soil near streams.

ARDISIA HUMILIS. (Vahl.) leaves obovate lanceolate obtuse, subentire, coriaceous contracted at the base into the petiol : racemes umbelliform axillary and terminal reflexed, shorter than the leaves : lobes of the calyx orbiculate, subciliate : lobes of the corolla lanceolate, subacute, twice the length of the calyx.—*D. C. Prod.* 8—129.

Eastern slopes of the Neilgherries, subalpine jungles, in moist soil near the banks of streams, flowering March and April. This is a beautiful and somewhat variable plant but is not likely to be confounded with any other species. Its showy rose or rather light purplish flowers shining black fruit and large bright shining leaves makes it a most conspicuous shrub. In favourable situations it becomes a small tree. That from which the specimens represented were taken was nearly 20 feet high. It is a widely distributed and conspicuous plant and has received several names as *A. Solanacia, littoralis, Doma, oleracea, umbellata, &c.*

I am uncertain to which of D. C.'s varieties this belongs but think his last.

ILICINEÆ—HOLLY-TRIBE.

This small order was formerly considered a tribe of Celastrineæ, and as such it occupies a place in DeCandolle's Prodromus. Brogniart, an eminent French Botanist, pro-

posed in 1826 to remove it and constitute the Holly-tribe a distinct order. Those who recollect the Holly-tree of Europe with its bright prickly leaves will scarcely suppose that the two here represented are species of the same genus, but yet, when the flowers and fruit are compared, and it is from them generic characters are principally derived, no difference is found except in the number of carpels, and that is not constant as may be seen by comparing figures 5 and 7 of the accompanying plate where one has 5 the other 6 carpels. In the European Holly, 4 is the usual number, so that the Indian forms (Prinos) can at best be only viewed as a section of the same genus, a view which is further confirmed by the fact, that the original *Prinos*, is described as having six lobed corollas, six stamens and six carpels; here we have them 5 lobed and 5 stamens, though it is not improbable six may occasionally be found. But the mere circumstance of such irregularity existing shows that characters taken from such variable organs are not to be depended upon, and, in the instance of this genus their value is still further reduced by a Nepaul species which has only two carpels.

The species are widely distributed but predominate in the warmer regions, the West Indies, South America, Cape of Good Hope, some in North America and several in India and Ceylon. Three are found on the Neilgherries and three or four on the more elevated regions of Ceylon. In Wallich's list of Indian plants six species are named exclusive of the Neilgherry ones. In Europe only one species is indigenous, the common Holly.

Several species are famed for the possession of active properties, the bark of the common Holly has been successfully employed as a substitute for Peruvian bark in the cure of intermittent fever and its berries are purgative and emetic, but perhaps the most celebrated is the Ilix Paraguayenses which yields the far famed Paraguay tea or *Mate*, of which a very full account has been published by Sir W. J. Hooker, in the London Botanical Journal. It is there said, " it is certainly aperient and diuretic, but its other qualities are more problematical, though, to individuals who accustom themselves to it, the habit becomes second nature and to break it off, or even to diminish the customary quantity, seems almost impossible. Like opium it certainly seems to rouse the torpid and calm the restless, but, as in the case of that noxious drug, the immoderate use of it is apt to occasion diseases similar to those consequent on the practice of drinking strong liquors."

I have quoted this passage with reference to one of the Neilgherry species *I. denticulata* which nearly accords with the American one in its Botanical characters, and may possibly, like it, when analyzed, be found to contain *Theine*, the Alkaloid of Tea and Coffee.

ILIX—Holly-tree.

Calyx inferior 4-6 lobed permanent. Corolla wheel shaped in 4-6 deep elliptical spreading concave lobes or as many petals slightly cohering by their broad bases, much larger than the calyx. Filaments awl-shaped shorter than the coralla, and alternate with its lobes. Anthers small two lobed. Ovary roundish. Styles none. Stimas 4-6-obtuse permanent. Berry globular 4-6-celled. Seeds solitary in each cell, oblong pointed angular at the inside rounded externally.—Trees or shrubs with alternate petioled, polished, sometimes

Govindoo, del

Ilex Wightiana (Wall.)

140

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4

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Incidado del

Ilex Gardneriana (R. W.)

prickly coriaceous leaves: axillary many flowered peduncles: flowers bisexual or imperfect and polygamous by the abortion of one of the sexes.

With reference to this last peculiarity it may be mentioned that the specimen figured of *I. Wightiana* has perfect bisexual flowers that of *J. Gardneriana* has them imperfect, the male organization only being developed. The latter was gathered in February and at the same season I examined many flowers of the other similarly imperfect on trees having fruit on them, whence I infer that the season at which the flower expands exerts some influence on their fertility.

ILIX (P.) WIGHTIANA. (Wall.): glabrous, leaves ovato-elliptic or elliptic acuminate entire, coriaceous: umbels numerous axillary or from the scars of fallen leaves, pedicels about the length of the peduncles, often longer: flowers often polygamous by abortion, corolla 5-6-cleft, berry 5-6-seeded.

Neilgherries—frequent: to be met with in flower at nearly all seasons, but in greatest perfection in all February and March.

A large umbrageous tree everywhere glabrous, leaves from an inch and half to two inches long, coriaceous, shining above paler and dull beneath, usually ending in a short abrupt acumen. Flowers very numerous, small, white; at certain seasons nearly all males, at others generally bisexual. Berries about the size of a pea, red when ripe.—I measured one tree 18 feet in circumference at about 6 feet from the ground.

ILIX GARDNERIANA. (R. W.): subarboreous glabrous: leaves ovate lanceolate or subcordate, ending in a tapering acumen: umbels axillary or aggregated on the naked branches: pedicels often shorter than the peduncles, sparingly hairy: calyx and corolla 5 lobed, the former sprinkled with short heirs.

In clumps of jungle near Sispara on the Western slopes of the Neilgherries, flowering in profusion in February.

A small tree or large shrub, and at the time we gathered the specimens figured, one of great beauty. It was not then in fruit, indeed most of the flowers seem males. It seems very nearly allied to the preceding but differs in habit, in its much larger, more membranous, and long acuminate leaves, and also in larger and more conspicuous flowers. At first I felt disposed to consider this a variety of I. Wightiana, viewing the larger size of the leaves and flowers as depending on the plants, being younger and more luxuriant, an error which Mr. Gardner first pointed out, I therefore dedicate the species to him.

SAPOTACEÆ.

This order is so tropical in its habits, that I am not aware of more than three species being found on the Hills, out of about 230 which it contains. On the plains they are more numerous, but so far as regards the number of species they are far from numerous in India, probably about 30 composing the whole. In the Madagascar Islands including the Mauritius and Bourbon, they seem to exceed that number, several are from the Eastern Islands, a few from China, New Holland and the Cape, but the bulk of the order are natives of America and the West India Islands. In its affinities this order seems nearly related to both the preceding, but is still amply distinct, so much so, that Lindley places all three in different alliances, esteeming *Sapotaceæ* more nearly allied to Rhamneous plants, *Ilicineæ* to Gentianeous ones and *Myrsineæ* to a third set vary different from both, consisting of *Plumbago, Plantago* and *Primula*. The affinities which led to the adoption of the two first of these seem to me overstrained, while those which connect *Sapotaceæ* and *Ilicineæ*, which appear stronger than the other, are altogether broken down. Between *Myrsineaceæ Primulaceæ* and *Plumbagineæ* the connecting links are strong, much more so, it appears to me, those between *Myrsineaceæ* and *Sapotaceæ*: while, as I understand them, the relationship between *Sapotaceæ Ilicineæ* and *Ebinaceæ* is most close and intimate: structure habit and geographical distribution all combining to give strength to the alliance. *Styraceæ* (the next order) which most Botanists look upon as so closely united with *Ebinaceæ* that Endlicher has even arranged them under that order as "allied *Ebenaceæ*," Lindley has placed next *Sapotaceæ* in his Rhamnal Alliance. In this distribution it seems to me he

has not been quite so fortunate as in the case of *Myrsineaceæ* except in so far as *Sapotaceæ* is concerned ; the relationship being apparently not less intimate between *Sapotaceæ* and *Styracaceæ* than between *Sapotaceæ* and *Ebinaceæ* while the relationship existing between *Styracaceæ* and the *Rhamnal* alliance through *Celastraceæ*, seems barely made out in some points and is altogether wanting in others of equal or even greater importance, whence there is reason to infer, Dr. Lindley's arrangement will not be adopted.

This order furnishes some very useful products the Gutta Percha the most valuable. The Sappodilla plum, a delicious fruit much resembling in taste a rich Jargonelle pear, belongs to this family. The Indian Eloopee's (*Bassia*) are variously employed, the stems, flowers and seed being all applied to some useful purpose. The stem as timber, the flowers as food and the basis whence a spirit is obtained by distillation, and the oil both for burning and as a substitute for ghee. The fruit of two species of *Mimusops* are eat by the natives, but not much admired and that of the *Sapota* here figured is pickled by the natives on the Hills. It much resembles in taste and appearance a small crab and is not likely to find many admirers unless it can be improved by cultivation and become like that of the *Sapota Acras* or Sappodilla plumb.

SAPOTA—SAPPODILLA.

Sepals 5-6 obtuse imbricated. Corolla tubuloso-campanulate 5-6 lobed : with as many epepetalous scales (sterile stamens) inserted on the tube alternate with its lobes. Stamens 5-6 opposite the lobes of the corolla below the scales : anthers extrose 2-celled dehiscing longitudinally. Ovary ovoid hairy 5-12 celled. Style cylindrical glabrous. Stigma undivided obtuse. Ovules solitary in the cells ascending anatropus. Berry by abortion few or one seeded, seed nutlike compressed elongated ; the inner angle sulcated. Testa shining. Albumen fleshy. Embryo central, radical inferior, cotyledons foliacious.—Milky trees, branches sometimes spinous : leaves alternate entire coriaceous : flowers axillary : berry apple-like, often large, fleshy, eatable when ripe.

This genus contains 12 species 3 of them Indian : three from Brazil two Australian one Mauritius one Philippine Islands one Guinea and one uncertain but all tropical except perhaps the last.

1218. SAPOTA ELINGOIDES, (Al. D. C.) : branches often spinous, ramuli ferrugenio-tomentose : leaves acute at both ends, glabrescent, entire : flowers axillary, few : pedicels the length of the petiol and like the calyx clothed with rusty coloured pubescence : lobes of the calyx ovate, acute, the 3 exterior ones broader : corolla about twice the length of the calyx, 5 cleft, lobes erect, ovate, acute ; tube, externally, pilose : anthers apiculate, sterile stamens oblong subulate, the length of the stamens, the back and the margins pilose.—*D. C. Prod.* 8—176.

Neilgherries, in almost every wood about Ootacamund, in flower and fruit at all seasons.

A large tree with rough cracked bark, hence much covered with both parasitic and epiphytic plants of all kinds. The flowers except from their number are not conspicuous, and have no beauty. The fruit is about the size of a crab, and not unlike one agreeing moreover in the sour austere taste of that fruit. It is made into pikeles, and the natives cook and eat it in their curries. The spines are axillary from 1 to 2 inches long : the leaves from 1½ to 2 inches scarcely coriaceous : flowers solitary, or 3 4 together, white : anthers, extrorse : ovary hairy, 5 celled, with a single ascending ovule in each, three or four of which usually abort before the fruit attains maturity.

ISONANDRA.

Calyx 4 parted, the two exterior lobes large. Corolla 4 cleft or 4 parted, lobes in æstivation, twisted to the left no scales. Stamens 8 in a single series all equal cohering at the base with the tube of the corolla. Anthers hastate, erect, 2 celled, extrorse, dehiscing longitudinally ; 4 larger opposite the lobes of the corolla. Ovary free, hisped, 4 celled (five, by a mistake of the artist, in the plate) ovules 4 ascending. Style exserted, glabrous Berry fleshy, one seeded by abortion, seed obovoid erect, testa cartilagenous, albumen copious, cotyledous foli-

Corrêa del.

Lafoensia Elongoidea A.C.D.C.

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aceous longer than the radicle. Trees with alternate entire leaves : flowers axillary, aggregated ; petiols short or wanting. The stamens of this genus being all perfect, and these opposite the petals more developed than those alternate, show clearly that the scales found in their place in other genera, are indeed abortive stamens. The dissections of this plate are not good, the relative sizes of parts not being properly preserved—the filaments are much too long—and the ovary is represented with five, in place of four cells, an error which escaped me when sending the original drawing to the Lithographer, and which I could not prevent at the time of making, as I was absent when the drawing was made.

This is a small genus all the published species, except one, being peninsular plants. Six have been published, and my collection contains two more, one of them from Ceylon. Two species are found on the Neilgherries, one in the woods between Pycarrah and Nediwuttum, and about the Avalanche, the other nearly half way down the Sisparah pass. In regard to properties, nothing, so far as I am aware, is yet known, beyond the single fact that it has recently been ascertained that the famous Gutta Percha is the produce of a species of this genus.

1219. ISONANDRA PERROTTETIANA (Al. D. C.) leaves elliptic narrowing at both ends, apex obtuse, base acute, glabrous above, slightly pilose beneath : flowers sessile, lobes of the caly ovato rotundate, silky; corolla deeply 4 cleft.—*D. C. Prod.* 8—188.

Neilgherries, in jungles, about Sisparah and the Avalanche, flowering February and March.

Arboreous, the remuli clothed with rusty coloured silky hairs, leaves from 3 to 4 inches long, shining above, dull or silky beneath, flowers small, sessile, forming dense capitulæ on the leafless branches, calyx of a brownish rusty colour, corolla white, style exserted, ovary 5 celled, with 1 ovule in each, fruit usually 1 seeded obovate. The analysis of this, as regards the calyx, is not quite correct.

STYRACACEÆ—STORAX-TRIBE.

This is a small order as regards genera, but not so as regards species, there being upwards of 120 distributed among six genera. It is rare that Botanists have to complain of there being too few genera for the species of an order, but on the present occasion, it would appear such is the case, the genus Symplocos, apparently including two if not three good genera. Linnæus was acquainted with five species, which he made the types of 4 genera. Three of these are still retained, the fourth, *Hopea*, which, if kept up, would have received the four accompanying species, and many other Indian ones, was long ago reduced and united with *Symplocos*, from which, judging from a species I possess (See Icones, No. 1237) properly referable to it, they seem generically distinct, it having long tubular flowers and many series of stamens all united at the base into a tube, in place of, as in ours, having the Corolla cleft nearly to the base, and the filaments free throughout. That obstacle to their union, is partly removed by grouping all the species in which it occurs into distinct sections of the combined genus, a proceeding which would have been unnecessary, had both the original Linnæan genera been allowed to remain. In that case, as already remarked, the whole section would have been referable to his genus *Hopea*, which would then have had the convenience of structural distinction as well as geographical distribution in its favour : all the Indian species, with the solitary exception above noted, belonging to it, while the true Linnæan *Symploci* appertain to the American Flora. A solitary *Hopea*, claims America as its native country, in like manner as a solitary *Symplocos* claims India for its place of abode.

The relationship between this order and *Ebenaceæ* is certainly very close, so close indeed that I doubt, whether technical characters can be found to separate them, though apparently distinct in nature. The character on which most reliance is placed, is the relative position of the ovary and flower, Hypogynous in *Ebenaceæ*, Perigynous in *Styraceæ*, but I think Mr. Bentham has shown, most satisfactorily, that in this instance these cannot carry much weight.

The genus *Symplocos*, § *Hopea*, abounds in the Alpine and Subalpine forests of India; nearly 40 species being already known, but I do not recollett having once met with a species on the plains. One *Symplocos*, § *Cyponema*, I found on the Pulney mountains, and also in Ceylon, but have not yet found it on the Neilgherries. It is an interesting species in connection with the Geography of that section of the genus which is otherwise exclusively extra Asiatic.

Of the genus Styrax, which gives the name to the order and includes nearly 50 species, four or five only are natives of India. As regards economical relations little need here be said, only one of the Indian ones so far as I am aware, being applied to any useful purposes. Some of the species of Symplocos yield a yellow dye, and it is probable most of the Indian ones would yield that colour, as the leaves of nearly all turn yellow in drying. Storax and Benzoin, two fragrant gum resins are obtained from two species of *Styrax* one a native of Syria, the other of the Malay Islands. While some of the Brazilian species, yield a fragrant secretion of a similar nature which is used in Roman Catholic Churches as frankincense.

The Indian species above referred to is *Symplocos laurina*, (now *S. spicata*), a native of the Neilgherries, the bark of which is celebrated in Bengal, as a mordant for red dyes, but has not, so far as I am aware, been similarly employed in the Carnatic, except perhaps as an imported article of commerce.

SYMPLOCOS.

Calyx 5-cleft, often ciliate. Corolla of 5-8-10-petals, in one or two series scarcely united at the base, but cohering by means of the adnate stamens. Stamens inserted into the extreme base of the corolla 15, or numerous sometimes penta—or poly-adelphous, oftener monadelphous, the tube of the stamens, more or less extensively united to the corolla. Filaments filiform, or ligulate contracted at the apex. Anthers ovoid, globose 2 celled, ovary inferior or half inferior, 2-4-5-celled, Ovules 2-4 pendulous from the apex of the cells. Style filiform, stigma capitellate, simple or 3 sided. Berry crowned by the calyx, often, by abortion, reduced to one or two cells. Seed solitary in each cell. Albumen copious. Embryo axile. Cotyledous very short. Trees or Shrubs: leaves alternate serrated or crenulate, usually turning yellow when dry: racemes axillary, many flowered, bracteate: flowers, sessile or pedicelled white or red.

This genus as it comes from the hands of Professor A. De Candolle, is a large one, including 60 species.—His very extended character makes it a complex and difficult one, especially as regards the character of the flower assigned to it, viz. a "Corolla scarcely cohering at the base," while the characters of his two first sections commence, "Corolla basi tubulosa" and these comprise 27, out of his 57 sufficiently known species. If the genus as it now stands, is, as he believes, truly a natural one, he might, I think, easily have avoided so great an anomaly as that in his generic character. The section *Hopea*, the only one we have to deal with here, has the "Corolla 5-parted spreading, stamina cohering at the very bottom, sometimes pentadelphous; filaments slender, ovary 3-celled, stigma capitate trigonous." This character brings together a very natural group of species, and if separated from the rest, would form, of itself, a very natural genus, susceptible of further subdivision towards facilitating the discrimination of its species. My acquaintance with the other sections of the genus, is too limited to admit of my offering any remark on them.

As remarked above, the tubular flowered species, are principally confined to America, while those with deeply parted corollas, or even polypetalous flowers, are principally of Asiatic origin. Some of the latter

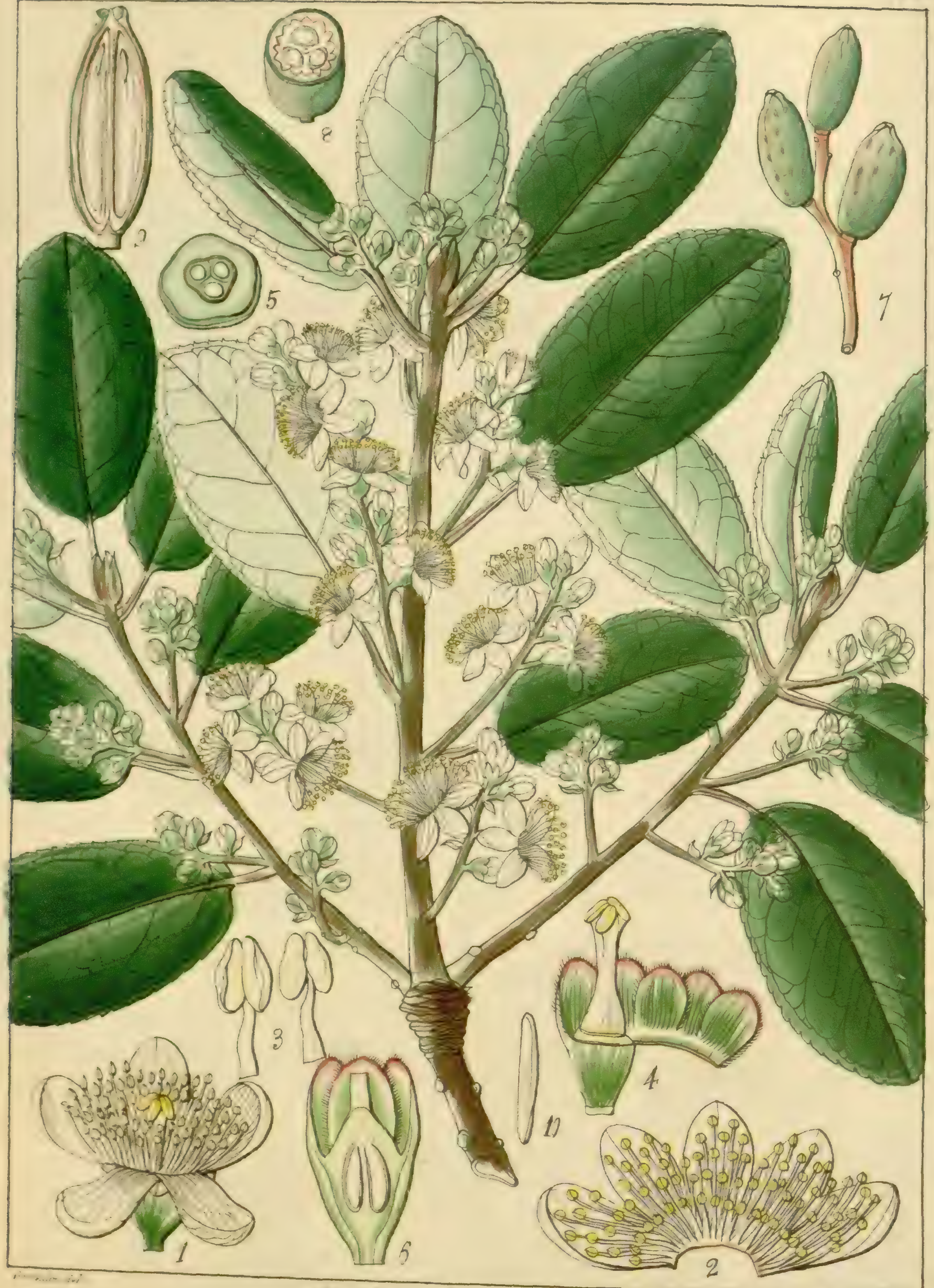
Symplocos pulchra (R. W.)

Govindoo del. Dumphy, Lith.

Symplocos Gardneriana (R. W.)

Govinaco del. Bourgeau lith.

Symplocos microphylla (R W.)



Symplocos obtusa Wallich

Dumpry Tuch

are objects of considerable beauty, as regards flowers, and as ornamental shrubs are really very handsome well deserving a place in every shrubbery. They are rich looking bushy plants, abounding in bright green foliage and flower freely in their seasons : *S. pulchra*, departs from the usual character of the genus, in its diffuse rambling habit, but is truly most beautiful. It grows near streams, below Sisparah. The figure gives no idea of the beauty of the flowers, as seen on the growing plant. *S. Gardneriana*, is a pretty tree with a fine spreading head which, during the flowering season, (February,) appears almost a mass of flower. It occurs in the small woods between Pycarrah and Nediwuttum. *S. microphylla*, forms a very pretty ramous shrub, about 6 or 8 feet high, also flowering in February, Mr. Gardner and I found it near the tops of the Hills behind the Avalanche Bungalow, on the banks of streams. *S. obtusa*, is not unfrequent in the woods or Shollahs about Ootacamund. The specimen figured was taken from a tree growing in one of those Shollahs behind Kelso Cottage. It is truly a beautiful tree, when in full flower, being covered from the base with ascending branches, loaded with its numerous short racemes of pure white flowers.

SYMPLOCOS PULCHRA (R. W.) shrubby, diffuse : ramuli, leaves, peduncles and bracts clothed with long brownish hair : leaves ovate, oblong acuminate, slightly cordate, setosely serrated : peduncles axillary filiform, several flowered (3-4) calyx lobes ciliate, corolla glabrous, ovary pubescent, 3 celled.

Sispara on the Western slopes of the Neilgherries, on the banks of streams, flowering in February.

A beautiful species, the snow white flowers contrasting with excellent effect with the brownish tawny coloured under surface of the leaves.

SYMPLOCOS GARDNERIANA. Arboreous, ramuli ferrugenio-tomentose : leaves petioled, elliptic acuminate, denticulate, glabrous above, tomentose on the costa beneath, pubescent on the lamina, veined, (4th series of veins visible under the lens) : racemes axillary, about half the length of the leaves ; flowers crowded, bracts, bracteols and calyx tomentose : style the length of the stamens, stigma capitulate.

In woods between Ootacamund and Pycarrah, on the Neilgherries, flowering in February. A considerable tree of great beauty when covered with its numerous white flowers and deep green leaves.

SYMPLOCOS MICROPHYLLA (R. W.) fruticose ramous glabrous : leaves elliptic, obtuse, serrated, coriaceous, glabrous, or with a few hairs on the costa beneath : racemes axillary about twice the length of the petiols, pilose : bracts ovate, obtuse, and like the calyx pubescent, lobes of the calyx suborbicular, ciliate, corolla scarcely longer than the stamens.

Neilgherries, high on the hills behind the Avalanche Bungalow on the banks of small streams, flowering in February.

A very ramous bush 5 or 6 feet high, and when found was covered with its numerous fragrant white flowers, leaves from 1 to 1½ inch long, and from 8 to 10 lines broad, slightly crenato-serrated. Fruit I have not seen.

SYMPLOCOS OBTUSA. (Wall.) leaves elliptic, obovato--orbicular above tapering towards the base, subdenticulate : racemes axillary, twice the length of the petiols, simple and like the flowers glabrous : lobes of the calyx roundish --Leaves 3 inches long 12-15 lines broad, veins prominent beneath, no quaternary ones : bracts caducous : tube of the calyx obconical, flowers subsessile, lobes of the calyx ciliolate.—*D. C. Prod.* 8, 255.

Neilgherries, frequent in woods about Ootacamund, flowering during the dry season, April and May.

OLEACEÆ—OLIVE-TRIBE.

In this tribe, the Flora of the Hills is rather rich, seven or eight species being found on them, belonging to three or, according to De Candolle's view, 4 genera. This order, though as a whole, not a large one, including, however, nearly 150 species, is yet one which is very interesting, as embracing within its circle, several rather unusual combinations ; here we have regular monopeltalous flowers, with only two stamens, which is rare : here we have an apetalous genus in the Ash : and here, in two sections of the same family, we have the plants of the one distinguished by having pendulous ovules and albumenous seed, while those of the other, have ascending ovules [that is, ovules attached nearer the base than apex,] and exalbumenous seed. Yet in spite of these discrepancies the whole are held together by what seems an indissoluble family tie—the facility of grafting on each other. On this subject, De Candolle forcibly remarks ; however heterogenous the Oleaceæ may appear as at present limited, it is remarkable that the species will all graft upon each

other, a fact which demonstrates the analogy of their juices and fibres: thus the Lilac will graft upon the *Ash* the *Chionanthus* and the *Fontanesia* and I have even succeeded in making the Persian Lilac live 10 years, on *Phillyrea latifolia*. The Olive will take on the *Phillyrea*, and even on the Ash, but we cannot graft the Jasmine on any plant of the Olive tribe, a circumstance which confirms the propriety of separating these two orders." There certainly can be no doubt or hesitation, in admitting the propriety of their separation, for in truth the only bond of union between the two families consists in both having regular monapetalous diandrous flowers, in all other points they are sufficiently distinct. Lindley even places them in different alliances, considering the Olives more akin to the Solanums and the Jasmines to the Borages and yet, in some essential points, the line of separation is almost imperceptible. The Jasmines for example, like the last section of Olives, have usually ascending ovules, and exalbumenous seed, some however, have the ovules suspended or actually pendulous; but on the other hand, their flowers in all points, except the stamens and carpels, show a quinary tendency; while those of the Olives are as constantly quaternary: the carpels of the former, as they advance to maturity, have a tendency to separate and produce two berries from one flower, while in the Olive they remain united, producing only one. This tendency to separation is considered characteristic of the Borages, while union is viewed as the constant character of the Solanums, and on these premises, Lindey's arrangement may rest on a firm foundation, though I confess, I am unable to trace the relationship.

The Olive tribe has a wide geographical range, but evidently gives the preference to the more temperate climates in both hemispheres, while many show a prediliction for the warmth of the tropics; most, however, of the peninsular species, are found either on the higher ranges of hills, or in the cool shady jungles of the lower ones, very rarely if ever extending to the open plains. Of the European forms, the Ash is that which attains the highest latitude, but the Privets and Lilacs are hardy enough to endure the climate of Britain one of them, the common Privet, being a native of England.

The true Olive is famed for its oil, and every one knows the fruit as a preserve. Its bark also possesses medicinal properties. Manna is produced from the bark of several species of Ash and the Lilac possesses, in an eminent degree, the febrifugal properties of Peruvian bark. In the arts, the timber of all the larger trees is considered excellent and is in general use. That of the true Olive is spoken of as indestructible!

OLEA.

Calyx shortly tubular, 4 toothed. Corolla hypogynous, shortly campanulate, limb 4-cleft, or 4-parted, rarely wanting. Stamens 2, attached to bottom of the tube exserted, hypogynous in apetalous species. Ovary 2-celled, with 2 collateral ovules in each, pendulous from the apex of the partition. Style very short, stigma bifid, lacinæ entire or emarginate, Drupe baccate, one or two seeded by abortion, putamen bony or fragile papery. Seed inverse, Embryo straight, in the axis of a fleshy or subfarinaceous albumen, and about the same length. Colyledous foliaceous radicle superior,—trees and shrubs with opposite entire, coriaceous leaves and axillary fascicled racemose or panicled flowers.

I have here retained the genus as defined by Professor Endlicher, and adopted his character in preference to that of De Candolle, who constitutes the species here figured, the type of a new genus, on account of

Olea robusta (Wall)
Nyctanthes robusta (D.C)

its sparingly fleshy fruit, and fragile papery not bony putamen, distinctions which I can scarcely consider of generic value, especially in a genus where we find considerable variation in the texture of the putamen, as well as in the fleshyness of the fruit. If the fruit of the cultivated Olive, is to be taken as the type in that particular, then, it is my impression, nearly all the Indian species may be removed.

As the genus stands in De Candolle's Prodromus, it includes 29 species, but 7 of these are imperfectly known, and may not belong to it, or if they do, may have been previously described under other names. In its geographical range, it is widely distributed - Europe, Asia, Africa, Australia and North America; all claim species. The one here figured was formerly described by Roxburgh under the name of *Phillyrea*. Endlicher reduced that genus, referring the species to *Olea*: DeCandolle has, however, taken a different view and not only retains both, but constitutes of Roxburgh's Indian *Phillyrea*, a new genus under the name of *Visiania*, which I cannot but view as a needless multiplication of genera in an order where such multiplication does not seem called for, either by the member of its species or by the complex differences of form and habit they present.

The Olive tree has long been looked upon with something approaching to veneration, as the emblem of peace and the terrestrial type of durability, the tree itself being one of those that attains the greatest age, and its timber being almost indestructible by the ordinary processes of decay. Every body knows the valuable Olive oil and most people are more or less intimately acquainted with the Olive itself as it comes to us preserved in a solution of Salt or Vinegar. I have never heard of any of the Indian species being employed for any purpose except as timber and the wood of some of them is said to be exceedingly close grained and durable.

1242. OLEA ROBUSTA. (Wall. *Phillyrea robusta*, Roxb. *Visiania robusta* D. C.) leaves elliptic, oblong, acute at the base, acuminated at the apex, entire: panicles terminal, large, diffuse; rachis and pedicels pubescent: style clavate: fruit subcylindrical.—Arboreous, wood very hard, leaves 3-4 inches long, 1 to 1½ broad, flowers somewhat fragrant, fruit size of a bean. —*D. C. Prod.* 8, 289.

A not unfrequent, usually small sized, tree in alpine jungles in Southern India, the specimens figured were gathered on the Eastern slopes of the Neilgherries, where it is to be met with in flower or fruit at all seasons.

According to Roxburgh, this tree attains in Silhet a large size, and furnishes the natives with a very durable timber. In Southern India, this, so far as I have seen is never the case, the thickest stems, and these short, rarely exceeding the thickness of a man's thigh.

The genus Visiania of De Candolle only differs from Olea in the fruit. He remarks of it—" Genus inter Oleam et Phillyream medium, priori dispositione florum et albumine carnoso, posteriori putamine chartacco affine." From this it appears, it only differs from Olea in having a paper-like fragile putamen, while Olea has a hard bony one, a distinction to which I cannot attach generic value.

LIGUSTRUM—PRIVET-TREE.

Calyx shortly tubular, 4-toothed deciduous. Corolla funnel shaped, tube longer than the calyx, limb 4-parted. Stamens two inserted within the tube of the corolla incluse. Ovary 2, with 2 ovules, pendulous from the apex of the septum, in each. Style very short. Stigma bifid obtuse. Berry globose, 2-celled, cells 2 seeded or by abortion, 1 seeded. Seeds inverse, ovate or angled, embryo straight, in the axis of a subcartilagenous albumen. Colyledons subfoliaceous ovato-lanceolate. Radical terete superior.—Trees or shrubs with opposite short petioled, ovate oblong, or lanceolate entire leaves: flowers, in terminal panicles or thyrses white: flesh of the fruit sparing, oily; hence showing an affinity with the Olive.

This is not an extensive genus, 9 species, only being yet known and some of these so very like, that it seems doubtful whether they are not kept distinct rather on the ground of geographical distribution than on botanical characters. As a whole it seems very nearly allied to Olea, almost the only appreciable difference being the greater length of the tube of the Corolla in Ligustrum. The flesh of the drupes in both is oily, and the putamen more or less bony.

The Privets are handsome, very ornamental shrubs, on account of their compact form when not in flower, and owing, when in flower, to every branch ending in a rich cluster of white flowers. The one here

figured, is very nearly allied to the common English Privet, so much so indeed, that, I suspect, if seed were slily sown in England and they were found competent to bear a European winter, they would almost pass for the English one. Curiously enough these pretty shrubs have not yet been methodically introduced into the hill gardens, though so ornamental and growing so freely in nearly all soils and exposures.

LIGUSTRUM PERROTTETII (D. C.) branches puberulous at the apex, leaves elliptic, obtuse at both ends, or subacute, glabrous, succulent, the thyrses terminating the branches, compound, compact.—D. C.

Neilgherries, frequent: to be met with in nearly all situations, on hilly pastures and banks of rivulets, and very uniform in its habit in both.

A ramous leafy shrub, from 2 to 4, or 5 feet high, leaves from 1 to $1\frac{1}{4}$ inch long, by about 6 to 8 lines broad, of a dark green color, usually obtuse at both ends, but occasionally somewhat acute: ramuli numerous, short, each terminating in a compact thyrse of fragrant white flowers: fruit oval, obtuse at both ends, about the size of a small bean.

D. C. hints that perhaps *L. Nepalense*, is a native of the Neilgherries; I have not met with any plant corresponding with his character, "branches softly villous," and "leaves villous beneath."

LINOCIERA.

Calyx minute, 4-cleft. Petals 4 linear, or oblong, elongated, united by pairs at the base, through the medium of the stamens. Stamens two, uniting the base of the petals, incluse. Ovary 2-celled, 4-ovuled, style very short, stigma emarginately 2-lobed. Drupe baccate, 1-celled by abortion, 1-seeded: putamen, thin sulcately striated. Seed inverse exalbumenous. Colyledons plano-convex thick, radicle very short, superior. Glabrous shrubs or, rarely, trees with opposite simple entire leaves: peduncles axillary, or terminal racemose or panicled: corolla white yellow or purple.

The two preceding species belong to the section *Oleineæ*, having albumenous seed, this belongs to *Chionantheæ*, having them exalbumenous, they differ moreover in the ovules in this being less decidedly pendulous, or in other words, attached below the apex, and in the one here represented, they are even attached below the middle, so as to become ascending, approaching, in that respect, the character of Jasmines, but though, in that particular structure, there is a point of affinity, there are more important ones keeping them apart. I therefore quite agree with those who view the two families as distinct. The genus *Linociera*, is divided between America and Asia, but preponderating in the latter. From *Chionanthus*, it seems scarcely distinguishable by characters, but we are saved the trouble of distinguishing, all the *Chionanthi* being from America. Three species described under that name by Roxburgh, have all been removed to *Linociera* by De Candolle. The accompanying species is very common on the Eastern slopes of the Neilgherries, and may be equally so elsewhere, a point on which however, I cannot speak with certainty, as I have only recently discovered that it was a new species of this genus, having for a long time supposed it to be *Olea Roxburghii*, which it much resembles.

1245. LINOCIERA INTERMEDIA (R. W.) leaves elliptic, acuminate at both ends, long petioled: panicles axillary, diffuse, about as long as the leaves: flowers aggregated on the points of the ramuli, sessile, often male by abortion: ovules ascending, stigma capitate, 2 lobed, fruit oval, one seeded.

Eastern slopes of the Neilgherries frequent, flowering during the rainy season.—Arboreous, glabrous, leaves opposite, from 6 to 8 inches long, including the petiol, panicles axillary, varying much in size, the larger one being about the length of the leaves, flowers numerous, white, frequently sterile by abortion, and then the panicles attain their greatest size; fertile panicles are generally shorter than the leaves. Flowers small: ovules ascending. I am uncertain whether this last structure is general throughout this 'Tribe,' but if so, the direction of the ovules afford a mark by which it can, when in flower, be distinguished from the Oleineæ: ovules ascending in this, pendulous from the apex of the cell in that.

This species seems exactly intermediate between *L. macrophylla* and *ramiflora*, but is more nearly related to the former.

JASMINEÆ—JASMINE-TRIBE.

This small order is pre-eminently Indian, and is found scattered all over the country and in the Southern Provinces, extending from the shore to the tops of the highest

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Imp. Drumgny, Lith.

Imp. Verneau et Cie

Ligustrum Vulgare (R. Br.)

Linociera intermedia (R. W.)

mountains, one being found in the woods about Dodabet, and that so nearly allied to I. *aureculatum*, a coast plant, that I was for some time inclined to look upon them rather as varieties than distinct species. They both belong to the 3-foliolate division, both have 2 ovules in each cell of the ovary and, almost invariably, one of these cells abort in its progress towards maturity, leaving a single berry, sometimes 2-seeded, in place of a double one, so common in the genus. Thus agreeing in so many points, it may still be doubted whether my first impressions were not the more correct, in which case we should have a species equally adapted to the plains of India, and to a climate almost European in its temperature. The genus *Jasminum*, includes nearly one hundred species, exclusive of eight named, but undescribed species.

Its station in the vegetable kingdom seems still undetermined. Hitherto it has been considered little more than a section of *Oleaceæ*, and, unquestionably, but, for its unsymmetrical flowers, it could scarcely be kept distinct, since, in both families we find erect or at all events ascending and pendulous ovules, and a whole section of the Olives, with exalbumenous seed; showing that no weight can be attached to the position of the ovules, those of some Jasmines being descending; nor to their seed being albumenous, as the same structure exists in the other. But the symmetrical quaternary flowers and valvate æstivation of the one and the unsymmetrical flowers and contorted æstivation of the other, at once shows how widely distinct they are in nature. According to my view, they are evidently more nearly related to *Apocynaceæ*, than with *Oleaceæ*, but according to Lindley, their true affinities belong to neither, but to the Borages a relationship which I confess I cannot so clearly make out.

India is certainly the native country of Jasmines, but a few extend to Africa and New Holland, two are natives of Europe and of South America. Their trailing habit fitting them so well for arbours combined with their profusion of beautiful fragrant flowers, have always secured much consideration, for this beautiful family of plants. The flowers of some of them yield a fragrant essential Oil, and the Orange coloured tube of the Nyctanthes is used as a dye. And who in India has not seen the fragrant ornaments for the hair and necklaces formed of their flowers, and considered by native women, on occasions of dress and ceremony, their chief decorations.

JASMINUM.

Calyx campanulate, 5-8 lobed, teeth sometimes subulate, sometimes short. Corolla salvour shaped; tube terete, limb flat 5-8 parted, lobes oblique, contorted in æstivation. Stamens two adnate to the tube of corolla incluse. Ovary 2 celled 1-2 ovuled: ovules erect, ascending lateral, or sometimes pendulous. Style simple, 2 lobed at the apex. Berry didymous, cells 1 or, rarely, 2 seeded. Seed erect exalbumenous.—Erect or scandent shrubs: leaves opposite or rarely alternate, all compound, or occasionally the petiol jointed in the middle, and bearing one leaflet, or sometimes bearing from 3 to 7 leaflets, and then the leaves are 3 foliolate, or unequally pinnate: panicles few or many flowered corolla, yellow or white, sometimes redish externally.

The bulk of this character is copied from De Candolle, but to render it applicable to the genus, as I have found it in India, it was necessary to introduce a few words regarding the ovary and ovules. In the original

" Ovarium bilobum," is all that is said regarding that important organ, and that little is not in accordance with my experience, the ovary not being two lobed, when the flower drops, though the fruit, owing to a peculiarity in its mode of growth, afterwards becomes two lobed. The number and position of the ovules, as here stated, differ from the generally received character. In Endlicher's Genera Plant, it is said, " Ovula in loculis solitaria e basi dissepimenti adscendentia anatropa." This is only partly right as I have found many with 2 ovules in each cell, and one, perhaps accidentally, with three ; some with them positively pendulous, from near the apex of the cell, and several with them lateral, but attached above the middle, so as to be in truth descending not ascending ovules, but few indeed, if any, really erect, that therefore I consider of rare occurrence, as compared with the other structure.

Much importance was at one time attached to the position of the ovules in this genus, as compared with those of the Olives, on the supposition that they supplied adequate ground for separating two groups of plants, which the eye told were not true members of the same family, but which, the reason failed in finding distinctive marks to separate. As an ordinal even as a generic character, it seems to me of no value ; and if employed as a specific one, except in a few extremely well marked cases, would probably often mislead. For these reasons, it must be discarded in practice, and other and more satisfactory ones sought for. The quinary formation and convolute æstivation of flowers of the Jasmines, as compared with the quaternary structure and valvate æstivation of the Olives supply very sufficient distinguishing marks.

1251. JASMINUM ERECTIFLORUM (Alph. D. C.) glabrous, leaves ovato-lanceolate, subcordate, long, accuminate : peduncles on the ends of the branches, ternate ; with from 5-7 erect condensed flowers on the apex : bracts linear, subulate, somewhat longer than the pedicels : lobes of the calyx 6, linear subulate : tube of the corolla 3 times longer than the calyx ; lobes 6-7, oblong, acuminate, half the length of the tube.—An extensively scandent shrub, extremities of the branches 4 sided, leaves 3-5 inches long, 15-20 lines broad, petiols 4-6 lines long, pointed near the base : cymes shorter than the adjoining leaves : bracts and lobes of the calyx erect : flowers white, fragrant. —*Alph. D. C. in D. C. Prod.*

Neilgherries, ascending to an elevation of about 6000 feet, flowering during the hot season.

This when in full flower is a very handsome species. Its large shining dark green leaves and numerous pure white fragrant flowers, render it a conspicuous object among the dense jungle in which it usually grows.

1258. JASMINUM REVOLUTUM (Sims. *I. Bignoniaceum* Wall. *I. aureum ?* Don's Prodromus,) glabrous, not scandent, branches angled ; leaves alternate, pinnated ; leaflets 3, 5, 7, 11, ovate, or ovate oblong, acuminate : panicles terminal, opposite the leaves, corymbose : calyx acute and acutely denticulate, lobes of the corolla subrivolute on the apex—Flowers yellow, fragrant.—*D. C. Prod.*

" Var. *β peninsulare* (Alph. D. C.) leaflets obovate, oblong, narrowing at the base, acute at the apex, flowers few.—Neilgherries frequent. An erect shrub 2-4 feet high, flowers solitary, or three or four together.

Neilgherries, abundantly distributed all over them, and always to be met with in flower, but in greatest perfection during the rains. Under the name *I revolutum*, perhaps, two species are confused, but as I am unacquainted with the original form, and as I infer that Alph. D. C. would not have referred this plant to it unless he had good grounds for so doing, I adopt his name, and bring here as a synonym Wallich's *I Bignoniaceum*, which must be identical with Var. *β.* of Alph. D. C., though referred by his father to a different Section, as there is no other plant having the slightest resemblance to it on the Neilgherries. D. C. refers here *I Chrysanthemum* Roxb. I also bring Don's *I aureum* here, though doubtfully, as he says, the leaves are opposite, which however,I suspect is an error, as I have a Nepaul specimen, accurately according in all other points with his character, but with alternate leaves.

Govindoo, del. Drawn by J. Sch.

Jasminum rectiflorum (Hook. D.C.)

ASCLEPIADEÆ.

This order, which is one of great extent, and so clearly defined by nature that, except in the case of a few outlying genera, it can scarcely be mistaken, was separated from Jussieu's order, *Apocyneæ*, by Mr. Brown. The few genera known to Jussieu were combined by him with a number of others out of which three other orders, *Apocynaceæ*, *Loganiaceæ*, and *Theophrasteæ* have since been constituted, so that the order, as left by him, included the elements of four orders. Each of these has, within the last few years, been largely augmented, but more especially *Asclepiadeæ* and *Apocynaceæ*, some of the larger genera of which include nearly as many species as the whole compound order, as known to Jussieu, did. The number of genera appertaining to it, defined by him, amounted to 29 only, and these not all true congeners, *Theophrasta*, which now forms the type of a new order, being one of them. Lindley, in his Vegetable Kingdom, gives a list of 141 genera of *Asclepiadeæ*, and states the number of known species at 910, but which may now be set down at 1,000, or perhaps many more. Of that number, probably about one-fourth are natives of India.

Generally speaking, it is tropical in its habits, nearly all its species being either altogether tropical or confined to the warmer regions on either side of that zone; hence, I presume, their paucity on the more elevated regions of these hills. On the lower slopes, where they enjoy a warmer climate, they are more numerous. Within the limits indicated, Asia, Africa, America, and Australia, all claim many species as their own, and a few even extend as far north as Europe. In India, they are met with in all situations, equally on the coast and on the tops of the highest mountains; on the banks of marshy rice-fields and arid stony ground; exposed to the full blaze of the sun's rays, and in the shady forest. Many of them are large twining shrubs with milky juice, but an extensive group, the *Stapelieæ*, is composed of square-stemmed, succulent, herbaceous, leafless plants, with acidulous, watery juices. The shrubby, twining forms are usually furnished with more or less succulent, opposite leaves, but several are leafless, or nearly so. It is however in the reproductive organs of this family that its most marked peculiarity exists. that by which it is distinguished from all the other orders of plants.

Like other dichlamydeous plants, the flowers of *Asclepiadeæ* have the usual calyx and corolla, the latter varying much in form in different genera, as will be at once seen by comparing *Ceropegia* with *Brachylepis*, or with the universally known *Calotropis*. the old Asclepias gigantea, so very common on the plains.

They have also, like other plants, stamens and a pistil, but both differing from the usual form, and presenting a structure peculiar to this tribe. The stamens have, moreover, in the plurality of species, a series of bodies, varying in shape, attached to them designated the staminal crown. These are very conspicuous in *Ceropegia elegans*, less distinct in the other species. And, lastly, the angles of the stigma are furnished with another series of bodies, designated stigmatic corpuscles. These are generally small, bright shining, brownish-coloured, oblong bodies, easily seen with the naked eye on looking closely into the flower.

The stamens, unlike those of most other plants have flattened filaments, which adhere by their edges, forming a tube round the ovary and style and are, apparently, without

anthers. The anther, in the generality of plants, is the yellow, powdery head, supported on the slender, thread-like filament, but here, on the contrary, it consists of two cavities, hollowed out of the apex of the filament, which, in place of containing a quantity of powdery pollen, are filled with two yellow, waxy-looking, gland-like bodies, attached, two and two, by slender prolongations to the corpuscles. These masses are the pollen of this order which, in this part of its organization, differs from all other exogenous plants: a similar structure is found to exist in the pollen of Orchideæ. The pollen masses, when removed from their cells and placed in favourable circumstances, produce numerous very slender tubes, which, entering the pores of the stigma, pass down into the ovary and there fertilize the ovules which it contains. These tubes can, with moderate skill in the use of the dissecting knife and microscope, be traced into the ovary. The removal of the pollen from the anther cell seems, in many, if not in all, instances a necessary preliminary to the production of the fertilizing tubes; hence, I presume, the paucity of fruit compared with the number of flowers. The ovary is double, or, in other words, the two carpels of which it is composed do not cohere in the axis, but remain distinct, the two apices only coalescing to form one large, usually pentangular, stigma, the angles of which bear the corpuscles. The front consists of two (sometimes only one, the other aborting) long, slender follicles (i. e. fruit opening along one side only), containing numerous flattened, pendulous seed, lying over each other like tiles on a house, each furnished at the apex with a tuft of long silky hairs, and presenting, when the testa, or skin, is removed, two leaf-like cotyledons ending in a pointed radicle. The leaves are in pairs, two and two, opposite; without stipules; and the peduncle, supporting the flowers, is not truly axillary but more or less removed from that point, between the leaves.

Endowed with structural peculiarities and habits so unique, the station of this order, in the vegetable kingdom, is still perhaps a problem to be solved, but in the present state of our knowledge, nearly all Botanists coincide in considering it more nearly allied to *Apocynaceæ* than any other. The younger De Candolle indeed goes so far as to say that the two orders are only kept apart by the difference of their pollen, showing how nearly they correspond in their general aspect and properties, when so acute an observer, after much study, has come to such a conclusion. It is one however which I cannot quite adopt, though I fully admit their near relationship. They seem also related to both *Jasmineæ* and *Loganiaceæ*, but are distinguished by having, like *Apocynaceæ*, a two-parted ovary and follicular fruit, and, usually, milky juice, none of which occur in these last-named orders.

Of their economical applications little need be said here. A few are employed in medicine; some yield dyes; one or two are celebrated for the tenacity of their fibres, which are made into cordage, bow strings, &c., and several are cultivated as ornamental plants, among which may be mentioned, *Asclepias curassavica*, so common in gardens in this country, but a native of America; and the fragrant West Coast creeper *(Pergularia odoratissima)*. To these ought unquestionably to be added, on these Hills, *Ceropegia elegans*, and *Decaisneana*, both beautiful flowering creepers—the former common about Coonoor and Kotergerry, the latter not unfrequent by the road side about a mile and a half below Sisparah. Besides these, there are several others of great beauty to be met with on the Hills equally worthy of this distinction. The other hill species of the order have little beauty to recommend them to like consideration.

Jasminum revolutum (Sm.)

Ceropegia Decaisneana (R. W.)

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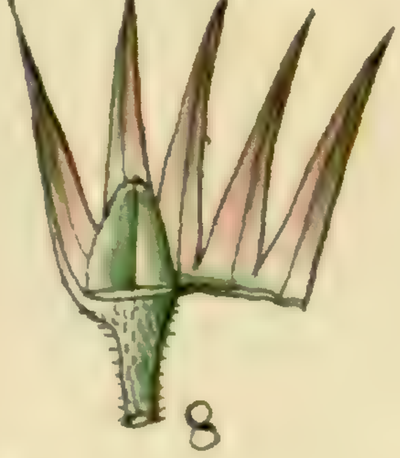

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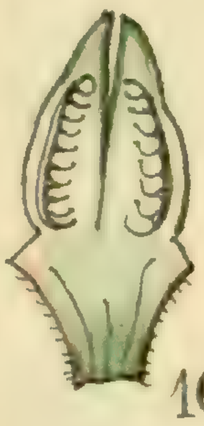

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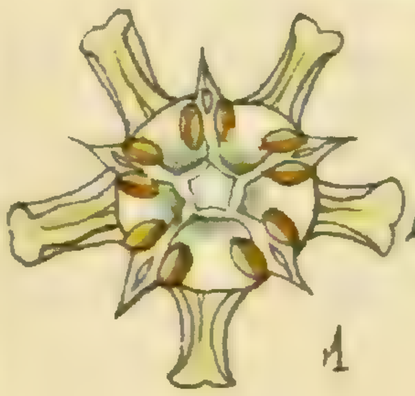

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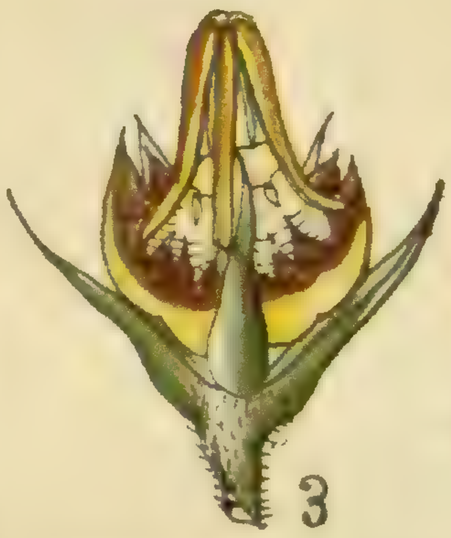

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Govindoo, del.

Dunphy, lith.

Ceropegia pusilla. (W. & A.)

CEROPEGIA.

Calyx 5-parted. Corolla tubular, more or less ventricose at the base, funnel-shaped; lobes of the limb compressed, strap-shaped, erect, often curved and cohering at the apex, not seldom ciliolate, valvate in æstivation. Staminal crown in a double series, campanulate or rotate, 5–10–15-lobed, the lobe opposite, the anther, usually the longest ligulate, often approximated at the apex. Anthers simple at the apex, destitute of membrane. Pollen masses erect, roundish, pellucid on the inner margin. Stigma flat. Follicles cylindrical, smooth, of parchment-like texture. Seed comose.—Twining shrubs or herbs, roots usually bulbous, stems woody or succulent, leafless or, oftener, foliaceous: leaves often more or less succulent, flowers umbellate, greenish-white, mottled with purplish or violet spots, more rarely uniformly yellowish. —Decaisne, slightly altered.

Of this genus, Decaisne characterizes 38 species, 21 of which are natives of India and the Eastern Islands. To these I have since added 7 species, raising the number to 28, and my herbarium still contains some unpublished species; so that it seems not improbable, the number of Indian species, now in herbaria, exceeds the total number known to him. They are curious plants, especially as regards the reproductive apparatus, which is situated at the bottom of a long tube, and completely secluded from external influences, of a character suited to displace the pollen masses from the sacks of the anthers. This is accomplished by insects which can easily enter in search of the honey secreted at the bottom, but once in, they cannot return till the flower fades, owing to the tube being lined with stiff hairs directed inwards and downwards, like the wires of a mouse trap. Thus imprisoned, the restless little creature is made the medium of bringing about fertilization, which could not otherwise take place; after which the flower fades, the hairs lose their rigidity and collapse, liberating the little prisoner to repeat the operation in another flower.

Several of the species of this genus so closely resemble each other that it is occasionally difficult to distinguish them by their more obvious external marks. In such cases I have had recourse to the staminal crown which varies in different species, but is most constant in each. The value of this organ, for the discrimination of species, will be seen by comparing those of the four here given. The following brief description of that portion of the organization may be useful towards explaining the mode of applying its variations to the determination of species.

The staminal crown, when present, in this order, consists of 5 pieces, attached to the stamens and alternate with the lobes of the corolla. In *Ceropegia* it appears to consist of a double series; the inner, of 5 pieces in the usual place, opposite or attached to the filaments; the outer, 10-lobed, or two lobes to each lobe of the interior. The inner series is generally much longer than the outer, but sometimes they are nearly equal, as in *C. elegans;* and then they are united by pairs to the inner one, and divided from each other. In other cases, the outer is much shorter than the other, with the lobes united for about half their length to each other, and free from the inner, as in *C. pusilla;* a third form is where the lobes of the outer are united nearly their whole length, strap-like, merely slightly cleft at the apex, as in *C. Decaisneana;* and in the fourth, *C. ciliata,* they are short, very broad, semicircular, and notched or emarginate. Other forms occur where the outer series seems wanting, having altogether coalesced with the inner. With the aid of these variations, the species are easily sub-divided into groups, which greatly facilitates their determination, as it is rare that similar looking, but distinct, species coincide in presenting both externa and internal marks so nearly alike, as to leave it doubtful whether or not they are varieties of the same species, a common occurrence in other very natural genera.

Ceropegia Decaisneana (R. W.), twining, glabrous: leaves lanceolate, acuminate at both ends, acute, hispid above, from short scattered rigid hairs, glabrous beneath: umbels pendulous, 6-flowered, pedicels divaricated, longer than the peduncles, flowers large, ascending, mottled with purple spots, calyx lobes setaceous, corolla clavate, largely ventricose at the base, lobes of the limb cohering at the point: secondary lobes of the staminal crown about half the length of the primary, erect, slightly cleft at the apex, tipped with purple.

Neilgherries, on the road side leading from Sisparah to Malabar, but rare; flowering March and April. An extensively twining, somewhat succulent shrub, leaves from 6 to 8 inches long, about 1 broad; corolla nearly 3 inches long, about ¼ of which forms the dilated base; secondary lobes of the crown yellow, tipped with purple without, deep purple within: follicles long and slender, not much thicker than whip cord.

Ceropegia pusilla (W. and A.), herbaceous, glabrous, erect, 2–6 inches high: root tuberous: leaves linear, lanceolate, succulent: flowers axillary, solitary, erect: corolla ventricose at the base, tube cylindrical, longer than the lobes of the limb: ex-

terior lobes of the staminal crown ciliate, shorter, the interior ones longer than the gynostegium: follicles erect, about two inches long, attenuated at the point.

Neilgherries, in pasture ground, but rare. I found it more abundant on the banks of the Picarrah river than elsewhere, but there too it requires to be closely looked for. The specimen figured is a large one of the plant.

CEROPEGIA CILIATA (R. W.), suffruticose, twining: root tuberous, stems glabrous, leaves short, petioled, ovate, lanceolate, attenuated towards the point, coarsely pubescent on both sides, hairy on the veins beneath, ciliate on the margin: peduncles axillary, about half the length of the leaves, hispid, umbels 6-10-flowered: calyx lobes subulate, shorter than the ventricose base of the corolla: corolla glabrous, lobes cohering at the points, shorter than the tube: exterior lobes of the staminal crown emarginate, ciliate, interior ones clavate, recurved at the points: follicles about 3 inches long, linear, tapering towards the point.

On clifts of rock at Katie Falls, Neilgherries, flowering June and July. The ciliation of the margins of the leaves, a constant, though, from the shortness of the hairs, not a conspicuous, feature in this plant, has unfortunately been altogether overlooked by the artist: in other respects the figure gives a correct idea of the plant.

CEROPEGIA ELEGANS (Wall.), twining, glabrous, leaves ovate-oblong, or oblong-lanceolate, attenuated or shortly acuminate, acute, somewhat succulent, ciliolate: peduncles equaling the petiols, few-flowered: tube of the corolla ventricose, curved at the base, purplish speckled; lobes subdeltoid, acuminate, cohering at the apex, often ciliate: exterior lobes of the staminal crown, ligulate, approximated, interior ones longer, inflexed, more or less united at the points: follicles very long, slender, glabrous, subtorulose: pollen masses brownish-coloured.—*D. C. Prod.*, 8, 642.

Neilgherries, frequent. The specimens figured were gathered in Kotergherry, on the Eastern descent. I have however met with it in many other places. It varies considerably in the colour of its flowers, the limb being sometimes purple, at others pale, the ciliæ are as often wanting as present, and seem to separate readily.

BÆOLEPIS.

Calyx 5-parted, corolla wheel-shaped, limb 5-parted, throat furnished with 10, or by cohesion of pairs, 5 minute scales at the bottom of the sinuses; throat bound with a ring below the scales. Filaments short, broad at the base, narrower above, each bearing a flat, bifid, appressed, coronal scale. Anthers cohering to the margin of the stigma, terminated by membrane adhering at the apex. Pollen masses ten, oval, granular, attached by pairs to the dilated, funnel-shaped limb of the corpuscle. Stigma muticous, depressed, 5-angled. Follicles divaricated, smooth.

Twining shrubs; ramuli pubescent: leaves opposite, oval, abruptly acuminate, the younger ones pubescent, adults glabrous, shining above, parallelly veined. Cymes interpetiolar, small, tomentose, divisions afterwards elongating, spike-like: flowers small, crowded; calyx and corolla externally hairy: segments of the corolla triangular, acute, purple within, spreading during the day, afterwards partially closing, becoming sub-campanulate.

The species here represented is the only one, yet known, appertaining to the genus, and, so far as I have seen, is only found on the Neilgherries. It is common about Kotergherry and readily recognized by the very dark green colour of the upper surface of the leaves, and their pale under surface, added to the almost whitish, very hairy young shoots and inflorescence which nearly conceals the very small, almost inconspicuous, flowers, except, during clear weather, when fully expanded; they then become conspicuous owing to their dark colour, contrasting with the light colour of their supports. The examination of fresh specimens enabled me to detect some errors in our original generic character which, however, were unfortunately overlooked, when preparing the analysis, which was not made under my eye, and not corrected when sending it to the press. The points requiring alteration were what relates to the pollen masses. and coronal scales. The former, in the original character, were stated to be four to each stamen, but which in several flowers I examined, I have always found limited to two, of an oval form, attached by one end to the dilated, cup-like limb of the funnel-shaped corpuscle, the pollen granular. The latter seems to have been overlooked in our former dissection, apparently, owing to their lying flat on the back of the filament. Another point, requiring emendation, was the character of the inflorescence which, in the original specimen, was two young to exhibit it correctly. At first it is truly cymose, but at length, through the elongation of the divisions, acquires a spike-like form, or in other words becomes cymoso-spicate. The points of the stamens, which adhere so as to form a kind of vault over the stigma, are not the true anthers but rather prolongations of the connectives beyond the cells of the anther.

Govindoo del. Dumont Lith.

Ceropegia ciliata (R. H.)

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Govindoo del.
Ceropegia elegans (Wall.)

Govindoo, del.

Brachylepis mervosa (W.&A.)

This generic name was, in the course of a few years, given to three distinct genera; first, in 1829, to a genus of *Chinopodeaceæ;* secondly, in 1833, to one of *Asclepiadeæ*, and, lastly, towards the end of 1834, to the plant here represented.

When I published this plate in my Icones, I was not aware of the existence of the first of these genera, and the second had been already reduced by its authors. It now becomes necessary to change the generic name given on the plate, to that at the head of this article, and as I have altered it in the following note on the species.

Bæolepis nervosa (Dcene, MSS. *Brachylepis nervosa*, W. and A.), young shoots and under surface of new leaves clothed with soft pubescence: cymes very hairy, furnished with numerous minute bractiols.

Common on the Neilgherries about Coonoor and Kotergherry, and generally about that elevation, (6,000 feet). Flowers small, purple, surrounded with much whitish hair. Leaves very dark green and shining above, below reticulated with strong, dark-coloured veins, at first pubescent, afterwards glabrous.

APOCYNACEÆ.

This is a large order, for the most part tropical in its habits, but complex in both its forms and properties. Here we find growing, side by side, small annuals and handsome trees, erect shrubs, and delicate twiners. Among its species, on the one hand, is found the intensely poisonous Tanghin *(Cerbera Tanghin)* of Madagascar, the kernel of whose fruit is justly placed among the most deadly of vegetable poisons, in as much as it is said one of them, though not larger than an almond, is enough to poison 26 men; and on the other, the Cow-tree of equinoctial America, which, when wounded, pours out a copious stream of sweet innoxious milk. Between these extremes, almost every shade of variety is found. The common Oleander is highly poisonous; the milky juices of the Plumerias (common in India), and *Allamanda cathartica* are purgatives, while in large doses they are strongly emetic and poisonous; others are mildly emetic. Some are aromatic, resembling Canella alba; or tonic, and used as substitutes for Cinchona. The roots of *Ichnocarpus frutescens*, a common Indian plant, are used as a substitute for Sarsaparilla. The wood of *Alstonia scholaris*, another common Indian tree, is as bitter as gentian. The fruit of *Willughbeia edulis* are, as the name implies, edible, and those of *Carissa Carandas* (the common Calacca) furnish a substitute for red currant jelly, and, which I state from my own experience, not a bad substitute for Damsons, when preserved by boiling in syrup.

In former days, when European tart fruits were less abundant than now, I have often treated my guests to Calacca tarts, from fruit so preserved, which were then much esteemed. This brief enumeration of characters and properties will suffice to show how variable this family is in its forms and properties.

The order was first defined by Jussieu, but so loosely, and made to contain so many dissimilar forms, that it has since been broken down, and the elements of four orders derived from the genera associated by him under one name. Three of these, *Asclepiadeæ*, *Apocynaceæ*, and *Loganiaceæ* find a place in this work. At a time when the known flora of the world, scarcely amounted to 10,000 species, and natural affinities were less understood, no great inconvenience was experienced from such extreme complexity of natural orders. But now that the number has been increased ten-fold, it has become necessary to investigate minute points of structure with untiring perseverance and skill with the aid

of most powerful microscopes. In this way the science has assumed a new form, numerous new orders have been constructed, and nearly all the old ones vastly enlarged. It thus soon became apparent that Jussieu's *Apocyneæ* could not be retained in the state left by him and, fortunately for science, the analysis was undertaken by our justly celebrated countryman, Mr. Brown, then and still, though now descending into the vale of years, having already passed the allotted age of man, threescore years and ten, the first of living Botanists. Forty years ago his memoir on *Asclepiadeæ* and *Apocyneæ* was published. In that paper he clearly defined the limits of the two orders, and shortly after, in his immortal Prodromous, he indicated the existence, among Jussieu's Apocyneæ, of a third order, *Loganiaceæ*, which is now universally adopted.

On that occasion he took up only one section of the order, that namely, most resembling *Asclepiadeæ*, as having follicular fruit, and the seed crowned with a tuft of down: and of the genera then referred to it, only one has since been removed, and transferred to the transition section, *Periploceæ*, of *Asclepiadeæ*, through the medium of which the two families almost interblend. A second nearly allied genus, subsequently established by him and similarly referred to *Apocynaceæ*, has also been removed. With these exceptions, all the subsequent most careful examinations have only tended to confirm the minute accuracy of those primary observations, undertaken at a time when minute microscopic investigations were less in vogue than they have, under his guidance, since become.

The order, as now known, includes about 100 genera and 600 species; of these the greater number are of tropical origin, a few only extending far into the temperate regions. Such being the case, a few only, as might be expected, are found on the higher ranges of the Hills. On the upper slopes they are more numerous, but it is not until we descend into the deeper vallies and plains that they form a distinct feature of the vegetation.

In its botanical relations, the family seems well located in its present place in the system of plants. *Apocynaceæ* are very distinct in their sexual apparatus from true *Asclepiadeæ*, but are occasionally scarcely distinguishable from the section *Periploceæ*, of that order, either by structure or habit, so that the transition from the one to the other is complete; and on the other side they pass equally imperceptibly into *Loganiaceæ*, though, in their more perfect forms, readily distinguishable from both.

In *Asclepiadeæ*, the sexual apparatus is all combined, the male and female parts being intimately associated in the centre of the flower, requiring both knowledge and skill to distinguish and separate them. In *Apocynaceæ*, they are readily distinguishable, but, for the most part, the stamens converge round the capitate stigma to which the anthers more or less adhere; while in *Loganiaceæ* they are quite free and distinct. In all the three orders the leaves are opposite, but in the two former without stipules, while in the latter there is usually a sheathing stipule within the petiols.

Among the *Apocynaceæ* there are many very handsome flowering trees and shrubs, qualities in which the Hill ones can scarcely be said to participate, though I believe, with some care in the culture, some of them might be rendered rather ornamental additions to the shrubbery. So far as I am aware, none of the Hill ones merit consideration for their properties. *Wrightia tinctoria*, from the leaves of which an Indigo is obtained, is common at the foot of the Hills, where also is found *Alstonia scholaris*, already mentioned, as distinguished for the intense bitterness of its wood.

Wrightia Wallichii. A. L. D. C.

WRIGHTIA.

Calyx 5-parted, with 5 scales or glands at the base, of which two are opposite the base of the 2 interior lobes, and the 5th opposite the edge of another lobe, hence they are all nearly alternate with the lobes of the calyx. Corolla 5-cleft, tube usually short; lobes twisted to the right in æstivation; throat crowned with appendages, equal or unequal, in the latter case the larger ones opposite the lobes of the corolla. Stamens 5, inserted on the middle or throat of the tube, protruding; filaments short; anthers sagittate, adhering to the middle of the stigma, ending in a short acute hairy point. Nectary none. Ovaries 2, adpressed, glabrous; style filiform, dilated at the apex; stigma obtuse, sometimes bifid. Follicles two, long, either cohering or distinct, sometimes cohering at the apex only. Seeds numerous, oblong, furnished with a tuft of hair at the interior extremity; coat of the seed double, exterior one somewhat striated longitudinally, soft, with 1 furrow, the interior one (albumen?) pellucido-membranaceous, covering the embryo on all sides; albumen none; radicle superior, short; cotyledons oval, cordate, longitudinally plicate, convolute to the right, much longer than the radicle.—Shrubs or trees, natives of India and Australia; wood white; leaves opposite, entire; cymes terminal; embryo, when immersed in water, becoming reddish violet.

This genus of rather fine flowering trees and shrubs, contains 15 defined species, two or three of which are found on the lower slopes of the Hills. The present one is rarely, if ever, found so high as Coonoor, but is not unfrequent by the road side lower down. It also occurs on the Shervaroys at Salem. Its white flowers, short, leafy, not fimbriated crown, and cohering follicles, at once distinguish it from the much more common *W. tinctoria*, which, however, seldom attains the same elevation that this does. This is further distinguished by generally appearing as a shrub while the other is a moderate sized tree.

In the appearance of the flowers, it somewhat resembles *W. mollissima*, which has dull-reddish flowers. *Wrightia tinctoria* is remarkable for furnishing a very good Indigo, of which considerable quantities are annually prepared by Mr. Fischer of Salem. The wood of *W. mollissima* is employed in the North of India by turners, while the yellow juice of *W. tomentosa* furnishes, according to Roxburgh, a permanent yellow dye. It does not appear that medicinal properties have been found in this genus. In the Walliar jungles, where the *W. tinctoria* abounds, considerable quantities of a coarse Indigo are extracted by the Natives, by whom the tree is called Nilum Pál, literally, as I understand, blue milk, in allusion, I presume, to an idea that the white milky juice of the tree becomes converted, in the process of extraction, into the blue dye.

Wrightia Wallichii (Alph. D. C.), leaves elliptic-obovate, acute at the base, obtusely acuminate, pubescenti-tomentose: cymes tomentose: lobes of the calyx broad ovate, rounded, externally pubescent, half the length of the glabrous tube of the corolla, the ovately rounded scales about half the length of the lobes: coronal appendages 10, ligulate, glabrous, unequal, the larger ones opposite the lobes, 3 crenate at the apex, about 4 times shorter than the lobes, the alternating ones a little shorter and narrower, 2-cleft: anthers hairy on the back.—Branches terete retuse towards the extremity: leaves 3–4 inches long, 15–18 lines broad, smoothish above, pur-purescent tomentose beneath, petiols 2–3 lines long: lobes of the corolla velvety: follicles about half a foot long, connate, cylindrical, rough with white spots, pointed.

Slopes of the Neilgherries—flowers white. Plants of this occur by the road side from about the middle of the ascent to the elevation of between 4,000 and 5,000 feet. The upper surface of the leaves, which in the figure is represented glabrous, is clothed with very short pubescence, giving them a velvety feel.

The original specimens of this species were collected in the Tenasserim provinces, but the Neilgherry ones do not seem to differ, at least not specifically.

CARISSA.

Calyx 5-parted, or deeply 5-lobed, without glands at the base, two of the lobes exterior. Corolla salver-shaped, lobes twisted in æstivation, tube hairy within, throat sometimes bearded. Stamens 5; anthers lanceolate, obtuse or apiculate. Ovary single, 2-celled, with 2 ovules in each; style filiform, glabrous, thicker above; stigma 2-lobed, hairy, caducous; ovules few, attached to the partition, amphitropal. Berry globose or ellipsoid, 2–4-seeded. Seed peltate, rough, albuminous. Embryo axile, straight, parallel to the linear hilum; radicle inferior; cotyledons ovate, about the length of the radicle. Ramous shrubs or small trees, lactescent, natives of Asia, Australia, and Africa. Branches dichotomous, spreading. Leaves opposite, entire, short petioled; spines opposite, sometimes bifurcated at the forks of the branches, changed above into floriferous peduncles.

Peduncles dichotomous, shorter than the leaves, often terminating the branches, or axillary, or extra axillary in the place of the spines. Flowers white, somewhat resembling those of Jasmines, fragrant; lobes of the calyx subulate, ciliate.

This extended character is somewhat abridged from Alph. De Candolle's, in his Prodromus. It is perhaps more dilated than is necessary for distinguishing the genus, as I believe there is none (certainly none in India) with which it is liable to be confounded, but in a work of this kind brevity is not demanded. The genus is one of considerable extent, including about 30 species, but some of these imperfectly known. Alphonse De Candolle defines 20 as known to himself, and names 7 more as less known. In addition to these, my herbarium contains two or three undescribed species, and doubtless more will yet be found in both India and Africa.

The plant here represented is abundant on the hills, but particularly so on the slopes leading down to the Kaitie Falls, where it forms a perfect jungle on each side of the road. It is a low, spreading, thorny shrub, in flower at all seasons, bearing a small, when ripe, bright black berry, milky before maturity and, when ripe, having a rather agreeable sweetish-acid taste, and might, I have no doubt, like that of the *C. Carandas*, be used as a preserve, either as a tart fruit, or for the sake of its jelly; except that the seed are so large in proportion to the pulp, that a great many would be required to yield a small return. It is however a pretty plant, the delicate green leaves and white flowers, tinged with pink, contrasting well with the bright black berries. I would recommend it to the attention of those who wish to enrich their gardens with native flowers.

Carissa paucinervia (Alph. D. C.), branches subdichotomous, armed: leaves elliptic, oblong, acute at both ends, mucronate, glabrous, short petioled, few-veined, oblique: peduncles terminal and axillary, much shorter than the leaves, 3-5-flowered; pedicels longer than the calyx, puberulous: calyx 5-cleft, slightly pilose, laminæ lanceolate, acuminate.

Neilgherries, abundant near Kaitie Falls, flowering during the hot season, April and May, but I believe generally to be met with in flower. A low, somewhat diffuse, very ramous, thorny bush: leaves elliptic oblong, mucronate, smooth and shining, light pea-green, from $\frac{1}{2}$ to $1\frac{1}{2}$ inch long, and about half as broad—flowers white with a slight dash of rose, berries about the size of a small bean, oval, dark purple.

OPHIOXYLON.

Calyx 5-parted, without glands, lobes linear, oblong, or lanceolate, erect. Corolla salver-shaped, much longer than the calyx; tube cylindrical, narrower at the throat, hairy within; lobes five, ovate, obtuse, twisted to the right. Stamens 5, inserted within the throat, incluse; anthers oblong, acute, longer than the filaments. Nectary cup-shaped, entire, undulated on the margin. Ovaries 2, compressed, connate at the base; ovules 2 in each, attached above the base; style 1; stigma ovoid, capitate, bituberculate at the apex, and fimbriate round the base and crown. Berries connate at the base, ovoid, 1-seeded, with a more or less rugous testa, embryo nearly as long as the seed, albumen fleshy (oily in *O. macrocarpa*, R. W.), cotyledons oval, lanceolate, or suborbicular; radicle pointing to the apex. Lactescent, erect, or twining shrubs. Leaves opposite or verticelled, oblong, acute at both ends, paler beneath, glabrous or sparingly pubescent beneath, cymes axillary, dichotomous, shorter than the leaves, many-flowered; pedicels short; flowers white or, with the calyx, reddish at the base. Berries black or red.

Of this genus, only one species was known in 1844, when De Candolle published the 8th volume of his Prodromus. Since then I have added 4 to the list, one from Ceylon, one from the Pulney Mountains, one from Belgaum, and the present, which is rather extensively distributed over the Neilgherries but most frequent, so far as I have seen, about Kotergherry, whence the specimen here represented was obtained.

It is a small, rather pretty looking shrub, conspicuous on account of bright dark green foliage, and small clusters of white flowers. In its general appearance it has no great resemblance to the original species of the genus, the rather celebrated *O. serpentinum* (the root of which is highly esteemed by Native practitioners as a remedy against snake bites, fever, and other affections), but an analysis of its characters shows that it clearly belongs to this genus, the above character of which is derived from the original species. According to Roxburgh, *O. serpentinum* is a large twining shrub, a form in which I have no recollection of ever having met with it, but on this point I refrain from speaking with any degree of confidence. I know that I have often seen it as a small erect shrub, and in that form it is not uncommon in gardens about

Govindoo, del.

Carissa paucinervia A.DC.

Ophioxylon Neilgherrense

Madras. The *O. Neilgherrense* is always an erect, ramous shrub, seldom exceeding three or four feet in height; rare, if it occurs at all, about Ootacamund, but frequent at an elevation of about 6000 feet above the sea. As it is not improbable, the other two new Continental species may be found on the Mysore slopes of the Hills, I subjoin their specific characters as given in the Icones.

Ophioxylon Neilgherrense (R. W.), shrubby, erect, glabrous, rather sparingly ramous; the leaves confined to the terminal ramuli, older branches naked: leaves oblong, elliptic, broader towards the apex, acute at both ends, shortly acuminate, glaucous beneath: corymbs axillary, cymose, trichotomous, solitary or two or three together: corolla hypocrateriform, tube about twice the length of the limb, hairy within; lobes of the limb oval, obtuse: ovary 2-celled, cells cohering, 2-ovuled: berries connate at the base, 1-seeded, ovoid, dark brownish-purple when ripe: seeds oblong, tapering at both ends, bony, smooth.

Neilgherries. Frequent about Coonoor and Kotergherry, and generally over the hills about that line of elevation (6000 feet), flowering in greatest perfection during the rainy season, (July to September), but may be met with at most seasons. Flowers pure white, and usually accompanied by full-grown fruit. Fruit about the size of a small bean, 2-3 lines long.

My collection still contains two undescribed species, the specimens however are scarcely sufficiently complete for full description. One of these from the Pulney Mountains is not in flower, but is distinguished by its large fruit, the nuts of which are nearly half an inch long: the other, from Belgaum, is not in fruit, but the flowers are very different from the preceding species. These two may be thus designated and defined.

1. *Ophioxylon macrocarpum* (R. W.), shrubby, glabrous, leaves broad obovate elliptic, abruptly acuminate acute, corymbs axillary, lax: calyx lobes linear, subulate: nuts obovate, slightly compressed, tuberculed: corolla ——.

This species is nearly allied to both the preceding but differs in its large tuberculated nuts—4–5 lines long and 2 broad—which are fully twice the size of those of either of the above.

2. *O. Belgaumense* (R. W.), shrubby, erect, glabrous: leaves elliptic, oblong, obtuse or acuminate: corymbs long, peduncled, compact, many-flowered: flowers longish pedicelled: calyx 5-cleft, lobes dilated, imbricating: tube of the corolla long, slender, lobes of the limb before expansion involutely imbricated, forming a round capitulum: stamens inserted about the middle of the tube.

My specimen of this, which is a very indifferent one, was communicated by Mr. Law. It is allied to the alpine group, but quite distinct from the three preceding ones, as shown by its compact inflorescence, very numerous capitate alabastra and broad imbricating, somewhat truncated, lobes of the calyx. The fruit I have not seen.

LOGANIACEÆ.

This is a small but curious and complex order, apparently held together by negative rather than positive characters, made up of a series of genera, nearly all of which have at different times been referred to other families, but from which they are removed because they would not properly associate with them, and sent here as a temporary measure, until further discoveries enable future Botanists to group them into more clearly defined orders. Here we find associated, under one family name, plants the most unlike, goodly trees and minute herbs, not three inches high; plants with and without stipules; flowers with valvate, imbricate, or twisted æstivation; corollas regular and irregular; with one or as many as 12 stamens, five being the predominating number. These again are either alternate or opposite the lobes of the corolla. The stigma is more uniform and wants the glandular apparatus found in *Apocynaceæ*, which Lindley considers the true distinguishing feature between the two families.

The plants selected to illustrate the order are perhaps among its most genuine representatives. Another genus, *Strychnos*, is found on the lower ranges of the Hills, but rarely extends higher than Coonoor, and rare there, but common on the lower slopes. The nux vomica is common at the foot of the Hills. The properties of some of the plants of this family are intensely venomous, of which the seed of the well known nux vomica affords a good example. But while the seed, in even small doses, is highly destructive of animal life, the wood is intensely bitter and is prescribed in the case of inter-

mittent fever; and the pulp of the fruit is greedily devoured by many birds. This last seems one of the most curious circumstances connected with this interesting tree. The seed, beat up with the white of an egg, is applied externally by the Natives as a discutient. The seed of another species, *S. potatorum*, has the curious property, when rubbed on the inside of water vessels, of rapidly clearing muddy water, hence the common name of "clearing nut." Its young fruit is made into a preserve and eaten by the Natives, but when ripe it acquires, in a milder degree, the properties of other species and is then prescribed as an emetic. Nothing seems known of the properties of the other two Hill plants of this family.

The species of this family, with a very few exceptions, are of tropical origin, hence I presume their rarity on the Hills. One, however, another species of Gardneria, whatever more, is found in Nepaul and Silhet.

FAGRÆA.

Calyx bibracteate at the base, 5-cleft, lobes imbricated, obtuse. Corolla funnel-shaped, tube enlarged above, lobes oblique, twisted to the left in æstivation, afterwards spreading, reflexed. Stamens free, inserted on the middle of the tube; filaments subulate, protruding; anthers 2-celled, incumbent. Ovary imperfectly 2-celled; style filiform; stigma peltate with a depression in the middle. Berry fleshy, oval, placentæ pulpose. Seeds peltate, numerous, small, crustaceous, immersed in pulp; albumen copious, fleshy, or somewhat horny; embryo transverse, as regards the hilum, sub-cylindrical; cotyledons about the length of the radicle, linear.—Trees or shrubs, sometimes twining, ramuli usually 4-sided. Leaves succulent, opposite, entire. Stipules sheathing within the petiol, often bedewed with a yellow resinous exudation. Cymes terminal, trichotomous; flowers large, white.

This is a large genus, for this order, as it includes 20 species. It is not one with which I am well acquainted, having only seen three species. A careful examination of these has, however, enabled me to introduce one or two slight corrections into De Candolle's character. In his character he calls the ovary two-celled, this I find is not the case in either of the two I have examined. In both it is, when examined at an earlier stage than is represented in the plate, 1-celled, the partial partitions from each side, not meeting in the centre, though they afterwards do so, but do not cohere. The tree here represented is not very unfrequent about Coonoor, but is not common. It is of low stature, of rather ungainly appearance, the leaves being all clustered, along with the large whitish flowers, on the ends of the youngest ramuli. The leaves themselves are much broader above, perfectly smooth on both sides, thick, fleshy and veinless, quite entire on the margin. The flowers are generally in threes, of a dull white, approaching to cream colour, with long projecting stamens. The seed are small, rough, somewhat kidney-shaped, attached by the middle, the embryo nearly the length of the seed, lying across the hilum, of nearly equal thickness throughout and enclosed in a copious fleshy albumen.

I have also met with this tree at Courtallum, at a considerably lower elevation than Coonoor. My other species is from Malabar; and Ceylon claims a third, all the others are stated to be natives of the Eastern Islands and Tenasserim Coast, one is found in Silhet.

FAGRÆA COROMANDELINA (R. W.), arborious, glabrous: leaves succulent, spathulato-oblong, slightly retuse at the apex, short petioled: stipules intrafoliaceous, closely embracing the stem: peduncles terminal, ternate, 3-flowered: corolla sub-campanulate, lobes revolute, obtuse: stigma peltate: berry elliptic, tapering at both ends, pointed with the persistent base of the style, fleshy: seeds small, subglobose, rough: embryo shorter than the fleshy albumen: radicle superior.

Courtallum and Coonoor, Neilgherries, flowering during rainy season. A small, rather ungainly, stunted-looking tree, bearing all its leaves on the ends of the young ramuli. Leaves fleshy, 4–6 inches long and 2–3 broad near the apex, peduncles usually 3 from the end of the branch each with 3 large white flowers. Corolla nearly 3 inches long, something between campanulate and wide infundibuliform. Stamens and style exserted. Berry elliptical, about $1\frac{1}{2}$ inch long, filled with fleshy pulp in which the numerous minute seeds nidulate. Seeds small, nearly globose, testa rough, ablumen copious, embryo axillary, terete, radicle superior.

Angraecum sesquipedale (Pl. 8)

Gardneria Wallichii (Wall.)

GARDNERIA.

Calyx small, 4–5-lobed, persistent, corolla rotate, 4–5-parted, throat naked, lobes ovate, leathery, valvate in æstivation, the margins thickened at the apex, stamens 4–5, alternate with the lobes, inserted on the throat; filaments short, oval-shaped; anthers erect, free, or somewhat coherent, free at the base and apex. Ovary free, ovoid, 2-celled; with one ovule in each; style filiform, shorter than the anthers. Berry globose, crowned by the persistent base of the style, 2-celled, with the seed attached to the middle of the membranaceous partition. Seed thin, orbicular, concave towards the axis, convex on the back; albumen horny, the shape of the seed. Embryo erect, cylindrical, radicle long, cotyledons lanceolate. Twining shrubs, branchlets 4-sided, afterwards round. Leaves opposite, entire, exstipulate; but the dilated base of the petiols grasping the branch. Cymes axillary, few-flowered; flowers pale-greenish coloured. Berry red or purplish, about the size of a pea.

This genus was established by Dr. Wallich for the reception of two Bengal plants. One a native of Nepaul, the other of Silhet, to which the accompanying has since been added from these Hills. It is frequent in the clumps of Jungle (Scholahs) about Pycarrah where it climbs to the tops of the highest trees, and then covers them with a rich canopy, forming most natural and shady arbours.

As a flower, it has little beauty to recommend it to notice, but is interesting as being, so far as I am aware, the only plant of the order, frequenting the higher range of these mountains. The foliage is exceedingly deep green, the leaves rather thick or somewhat fleshy, very smooth and quite entire. I do not know of any active property residing in this plant, but judging from the family to which it belongs, it seems not improbable, that it is not quite innocent of such.

1313. Gardneria Wallichii (R. W. in Wall. pl. as. rar. 3 tab. 281), glabrous, voluble: leaves oval acuminate at both ends, acute: cymes axillary, peduncled, much shorter than the leaves:.flowers tetrandrous: berry globose.

Frequent on the Neilgherries, flowering March and April.

It is an extensive climber, ascending to the tops of the highest trees, and then covering them with its numerous branches and very dark green foliage. Flowers of a dull yellowish colour.

GENTIANACEÆ.

It was remarked of the preceding family that it was so peculiarly tropical in its predilections, that a few species only were found in temperate regions. The reverse is the case here, by far the greater portion of this large and beautiful family being composed of extra tropical plants, not a few of which reach nearly to the line of perpetual congelation, while a few only are found within the tropics. This will account for their frequency on the Neilgherries, where they form a marked feature of the flora, both as regards the number and beauty of the species. For the elucidation of this order, I have selected five species referable to 4 genera, all conspicuous for their beauty, and which, it appears to me, might all be with advantage introduced into the flower garden where, under proper culture, their native beauties would be heightened.

The family is divided into two tribes or, more properly, sub-orders, the plants of each being so unlike, both in habits and appearance, that they might without violence constitute distinct orders. To the first, *Gentianeæ*, all the Hill species belong: to the second, *Menyantheæ*, a series of aquatic plants, many of them floating, are referred. But though thus distinct in external features they accord in points of structure esteemed of greater importance in the limitation of affinities.

The Hill ones are generally easily recognized by their erect form, 4-sided stems and branches, opposite, entire, smooth leaves, and terminal corymbs, of generally more or less decidedly blue flowers. The little Gentian is the only exception, it being procumbent. They belong to the corolliflorous class, which has monopetalous inferior flowers, with the

stamens inserted on the tube of the corolla. The stamens are either 4 or 5, the filaments sometimes, though rarely, dilated and cohering at the base. The ovary is one-celled with parietal placentas. In the genus *Exacum* the margins of the 2 valves, of which the ovary and capsule is composed, are inflexed and somewhat free within the cell of the ovary, but more commonly they meet and coalesce, forming a parietal placenta, as shown in *Gentiana*. In *Halenia*, on the other hand, they enlarge at the point of junction, forming a thick fleshy mass, filling the whole of the centre of the cell and bearing two rows of seed on each side. This part of the structure is unfortunately very badly brought out in the accompanying plate, but is well shown in one subsequently prepared for my Illustrations of Indian Botany. And, lastly, in *Ophelia* there are 4 parietal placentæ, a very unusual structure in the family, but which may be accounted for on the supposition of their being sub-marginal, that is, the ovuliferous margins, in place of being so deeply inflexed as to become loose like those of *Exacum*, are simply folded in and adhere to the face of the valves, thus forming two placentas on each. This peculiarity seems not to have been noticed by writers on this family; Grisebach indeed describes the ovules as inserted on the suture, which is not quite correct.

As already mentioned, this family has a very wide geographical range, its species extending from either polar circle to the equator, thus at the same time luxuriating within a few feet of perpetual congelation and on the most arid plains of the tropics. But while this is true to the letter, we must not overlook the fact that, of those found within the tropics, the majority inhabit the cool mountain tops, a few only occurring on the plains, and most of these only arriving at maturity during the cooler seasons of the year.

As regards properties, bitterness is the distinguishing characteristic of the family, hence many of them are highly esteemed as tonics and restoratives in domestic medicine, and several are in daily use for the same purpose in medical practice, the root of the officinal gentian *(G. lutea)* being among the most esteemed.

In regard to the plant here named, *Halenia Perrottetii*, I may remark, that it is not that species but apparently a variety of *H. elliptica*—a species also found in Nepaul. The true *H. Perrottetii* has longish, ovate acute leaves, not short elliptic, obtuse ones, as in the plant I have erroneously so called. They are very nearly allied, if really distinct.

EXACUM.

Calyx 4–5 parted, segments keeled or winged on the back. Corolla rotate, withering, tube becoming globose, limb 4–5-parted. Stamens 4–5, inserted on the throat; anthers remaining unchanged, opening by a pore-like slit, at the apex. Ovary spuriously 2-celled, the free inflexed margins bearing the ovules; style distinct, declinate, deciduous; stigma capitate, undivided, or with a slight transverse furrow. Capsule spuriously 2-celled, dehiscing between the inflexed margins (septicidal) which sometimes adhere in the centre, sometimes remain distinct, seed minute, immersed in the placenta. Usually annual, erect, straight, herbs, very smooth, with terminal cymes; flowers usually blue, but sometimes nearly white.

The species of this genus are for the most part beautiful flowering plants, the flower, of all I know, except *E. bicolor*, are some shade of, often deep, blue. Grisebach in his generic character describes the ovary as 2-celled, with the ovules attached on both sides to the central suture. This part of his character I have altered as not being quite consonant with fact. The real structure is not well shown in either of the plates, but when carefully examined, there is no difficulty in discovering that they do not cohere in the centre, though they meet, the placentiferous margins being covered with ovules which touch, but not the placentæ. This is well shown in my Illustrations, the dissections of which were executed with more care, after I had received his monograph, which I had not seen, when the drawings for the accompanying plates were made.

Exacum Perrottetii (Grisel)

Gowindow del

Dumphy, Lith

Eurcum: bicolor (Fisch.)

The genus is one of considerable magnitude, containing, according to Grisebach, 22 species, all natives of India and the Indian Islands. Here they occupy a wide range, as regards elevation and temperature, some being natives of the plains, almost on the sea level, while others, and the more conspicuous ones, occupy the highest mountain ranges of both the Peninsula and Ceylon. The two species figured here are from about Coonoor and Nedawuttim. I am uncertain whether they would bear the colder climate of Ootacamund, but if they were found to do so, I would esteem them desirable additions to the flower garden.

The species of this genus are sometimes of difficult discrimination, so much so, that I do not feel quite certain, whether I ought not to view the plant here figured, under the name of *E. Perrottetii*, as a tetandrous variety of *E. Wightianum*, which is also not unfrequent on the Hills. It is quite possible, I may not have got the true plant, as there are some discrepancies between my plant and Grisebach's character. According to his character, there is some difference between the form of the lobes of the corolla, and those shown in the figure, and, as I understand, the anthers are more elongated than in my plant. The other, *E. bicolor*, accurately corresponds with Roxburgh's description, though he obtained his plants from Cuttack. It abounds among long grass, on the slopes about a mile below Nedawuttim.

Exacum Perrottetii (Griseb.), stem straight, 4-angled, simplish: leaves sessile, oblong, lanceolate, acuminate, 5-nerved with smooth margins: calyx deeply 4-cleft, segments subulate with semi-lanceolate wings: corolla rose-coloured or blue, lobes obovato-elliptic cuspidate, 4 times longer than the tube. Griseb. l. c.

Neilgherries, Coonoor, Kaitie Falls, &c., frequent. Stem erect, about two feet high, simple below the cymes and cymules from the upper axils: internodes shorter than the leaves: pedicels about an inch long with a small bract, corolla about 1½ inch in diameter: anthers like those of E. Zelanicum: capsule erect, ovoid-globose.

Exacum bicolor (Roxb.), stem 4-angled: leaves sessile, ovate, subacute, 5-nerved with smooth margins: calyx deeply 4-cleft, segments subulate with ovato-lanceolate wings: corolla white, tipped with blue; lobes elliptic, oblong, cuspidate, three times longer than the tube, which is is a little shorter than the calyx.—Corolla large, nearly two inches in diameter, cymes terminal sub-contracted: middle internodes usually shorter than the leaves. Griseb. in D. C. Prod.

Neilgherries, below Kotergherry, rare; in pastures about a mile below Nedawuttim abundant, flowering during the autumnal months.

GENTIANA.

Calyx 4–5 parted, or cleft, valvate in æstivation. Corolla marcescent (withering on the stalk), funnel-shaped, or salver-shaped, naked or furnished with a crown; limb 4–5-parted, or, counting the folds, spuriously 10-cleft. Stamens 4–5, inserted on the tube of the corolla; anthers incumbent, or erect; sometimes united into a tube, opening externally. Ovary, sometimes bound with a spurious, interrupted disk, 1-celled, ovules near the sutures; stigma 2, terminal, revolute or, if contiguous, funnel-shaped; style none, or with the stigma, persitent. Capsule 2-valved, septicidal, 1-celled; placentas membranaceous, inserted along the edge of the sutures. Seed immersed in the placentas.—Herbaceous perennials of various habit, erect, or procumbent, with raceme-like cymes, or terminal flowers.

Of this very extensive genus, including nearly 160 species, only one is found on the Neilgherries, and that one enjoys a very extended geographical range. Wallich and Royle have it from the Himalayas, Kunawar and Nepaul, and I have gathered it on the Neilgherries, Pulneys, and Neuera Ellia in Ceylon. This order, as stated above, is remarkable for the extent of its geographical range, and some of the species of this genus exhibit this property of diffusion in the most remarkable degree. The following extract from Hooker's Antarctic Flora presents, I believe, one of the most remarkable examples of the kind yet known in the vegetable kingdom. "One species, *G. prostrata*, has a most extraordinary range, both in longitude and latitude; in Southern Europe it inhabits the Corinthian Alps, between 6000 and 9000 feet high; in Asia it has been found on the Alti Mountains about N. latitude 52. Its American range is much more remarkable, it having been gathered on the tops of the Rocky Mountains in lat. 52 N., where they attain an elevation of 15,000 to 16,000 feet, and on the east side of the Andes of South America in 35 south; it descends to the level of the sea at Cape Negro; in the Straits of Magellan in lat. 53 S., and at Cape Good Hope, in Bherings Straits in lat. 68½ N."

This is the only Indian species of this large genus, so far as yet known, which extends so far south. As seen nestling among the herbage on the Neilgherries, on the grassy pastures of almost every part of which, above 6000 feet of elevation, it occurs, it is a beautiful object, expanding its small, but bright blue flowers during sunshine, nearly all the year round. Though generally a favourite, with those fond of flowers, but few if any attempts have been made to improve it by cultivation, and in its natural state it seems too common and inconspicuous an object to attract much attention, or lead to its introduction into gardens. I cannot, however, divest myself of the opinion, that with care it might be much improved, as regards the size of the flowers, and nothing can be richer than the deep blue of the corolla.

GENTIANA PEDICELLATA (Wall.), stem loosely ramous, glabrous: leaves elliptico-lanceolate, the broader ones aristate at the apex, smooth on the margins, the lowest ones rosulate: flowers pedicelled: calyx campanulate 5-cleft, lobes ovate cuspidate, recurved at the apex, shorter than the clavate tube of the corolla: corolla blue, the tube furnished with 5 projecting, triangular, acutely mucronate lobes: plicæ emarginate: capsule obovate, rounded at the apex.

Neilgherries, frequent in pastures flowering at all seasons. The bright blue flowers render this a conspicuous plant even though the foliage can scarcely be distinguished from the surrounding herbage. It seems to have a wide geographical range, extending on alpine ranges from the Himalayas to Ceylon. I have now gathered it on the Neilgherries, Pulney Mountains and Neuera Ellia in Ceylon. I think it is also found on the higher hills in Coorg and Mysore.

OPHELIA.

Calyx 4–5-parted, segments united at the base, valvate. Corolla marcescent (withering on the stalk), rotate 4–5-parted, destitute of folds or crown; furnished with pits or glands above the base, either naked, or oftener covered with a fimbriated scale. Stamens 4–5, inserted on the throat of the short tube; filaments sometimes united at the base, monadelphous, sometimes equal and free; anthers incumbent, nodding or erect, often greenish. Ovary one-celled; ovules numerous, inserted on the sutures; stigmas two, short, often revolute; style wanting or short. Capsule 2-valved, one-celled, spliting along the suture); placentas either spongy, sutural, or expansions on either side, near the suture. Seed immersed in the placentas, very small, wingless. Herbaceous annuals or perennials, erect, ramous, panicled. Leaves opposite, terminal, cymes umbel-like.

To this genus Grisebach assigns 18 species, but several have since been added. Of these eighteen, 16 are natives of India, one is from China, and one from Australia. The genus was first separated from *Swertia* by Don, on the ground of its having rough angular scrobiculate seed, those of Swertia being compressed and more or less winged. Grisebach has in his characters of the genera suppressed these (Don's) distinguishing marks, whether correctly or not, I am unable to say, but so far as I am able to make out from a comparison of his own written characters, there is actually no difference between the two genera; and, even supposing Don's distinctions constant, I am scarcely prepared to accord to them generic value, in opposition to identity of habit and structure in every other part of the plant. Could geographical distribution have been adduced in aid of the distinctions taken from the seed, that is, had the European forms all had compressed margined seed and the Asiatic and Australian ones, globose or angular ones, the case would have been different, but as the case now stands, it seems a case of distinction without a difference. Being however unwilling to create additional confusion, I have preferred retaining the genus as constituted by Grisebach, simply because all the Neilgherry ones are referred to it, thereby, so far as our flora is concerned, removing all difficulty.

In its geographical distribution, all the Indian species inhabit elevated mountain ranges, and flower during the coolest season of the year. Those of the Neilgherries grow on the grassy slopes and about the outskirts of woods, generally on moist soils and mostly flower during the rainy season. Of course they are met with at other times, but attain their greatest perfection during the autumnal months. Like the rest of the family they are bitter, and doubtless might, like the true gentians, be used as tonics. I am not aware of any having been so employed, but that they might be I feel pretty certain.* Several of them are plants of great beauty, and seem to merit on the part of horticulturists more attention than they have yet received. Were they only procurable from Europe, they would be prized, and I think it pro-

* Since this was written I learn from Walter Elliot, Esq. of one at least being used in the Northern Circars as a substitute for Creyat (Justicia paniculata).

Gentiana pedicellata (Wall.)

Corrigan, del. Dunphy Lith.

Ophelia corymbosa (Griseb.)

Gouindoa del Incomptus lith.

Kutenia Perrottetia (Griseb)

bable, if persons on the Hills were to collect seed and send them to England, they would soon be taken notice of there. In addition to the one represented here, there are three or four others, natives of the Hills, all pretty, though not so conspicuous as the *Exacums*. They have the advantage of continuing in flower a long time through the successive opening of fresh portions.

I remarked, rather inconsiderately, I fear, in my Illustrations, that this genus seemed to have a four-carpelled ovary; subsequent consideration and more recent examination have led me to conclude that that was an erroneous view of the structure, and that this genus does not differ from the rest of the order in the structure of its ovary.

OPHELIA CORYMBOSA (Griseb.), stem 4-sided, ascending, branches divaricate: leaves spathulato-elliptic, roughish, 3-nerved; the lower ones largest, the stem ones short sessile: cymes sub-fastigiate, few-flowered, pedicels spreading, segments of the calyx linear acuminate, half the length of the corolla: corolla 4-parted, blue, segments obovato-elliptic, mucronate: foveæ minute, orbicular, solitary, covered with a scale, fimbriate at the apex, and themselves bound with short fimbriæ: filaments linear.

Neilgherries, not unfrequent during the rainy season in pastures and about the outskirts of woods. The lower branches of this are not fastigiate, but often nearly horizontal, the flowers only looking to the sky, in which respect it differs considerably from another which Grisebach has joined with it.

HALENIA.

Calyx 4–5-parted, lobes united at the base, valvate. Corolla withering, shortly campanulate, 4–5-cleft; lobes erect, destitute of folds or fimbriæ; the glanduliferous pits prolonged into spurs! Stamens 4–5, inserted on the throat of the corolla; filaments equal at the base; anthers small, incumbent. Ovary spuriously 2-celled, from the thickened spongy placentæ meeting in the centre; ovules numerous, superposed, inserted on the inflexed margins of the valves; stigmas two, sessile, or with a shortish style, often connate and confluent with the ovary. Capsule 2-valved, septicidal placentas sutural. Seed immersed in the placentæ, globose; embryo superior, minute; albumen copious. Herbaceous annuals or perennials, erect, ramous; cymes terminal, umbelliform; flowers usually yellowish or tinged with blue; corolla about twice the length of the calyx.

I have altered the character as regards the ovary to make it correspond with the two Neilgherry species. I may here remark that the figure of the ovary, as given in the accompanying plate, is not quite correct. A better representation is given in my Illustrations of Indian Botany, where the true *H. Perrottetii* is figured. The drawing from which this plate is taken was not made under my eye, and the section of the ovary does not clearly exhibit its structure and the position of the ovules, a circumstance which I now greatly regret not having detected before sending the drawing to the Lithographer. This is not the true *H. Perrottetii* but either a very distinct variety or *H. elliptica*, only hitherto known from the Himalayas. I now call it *H. elliptica*.

The species of the genus *Halenia* are for the most part natives of the alpine regions of Northern Asia, and America, but some are found in Mexico and the Andes of Peru. This, and its congener are the only ones found in Southern India. I have not seen Ceylon specimens and do not know whether it occurs there. I found it on the Pulney Mountains. It presents a considerable variety of forms. I have specimens with distinctly petioled leaves and others which correspond in form with the one here represented, but scarcely exceeding 6 inches in height. The acute leaved *H. Perrottetii* is sometimes found, in moist shady forests, from 4 to 6 feet high.

The genus is a curious one on account of the remarkable spurs of the corolla. Linnæus originally referred it to *Swertia*, calling the only one he knew *Swertia corniculata*, in allusion to the horns or spurs of the corolla. The flowers, though far from conspicuous, are rather pretty from the interblending of blue and red with the yellowish ground colour of the corolla, points not well brought out in the plate.

HALENIA PERROTTETII (Griseb.), stem erect, ramous: leaves ovato-lanceolate acute, 5-nerved, subsessile: pedicels axillary and terminal, unequal, filiform: segments of the calyx lanceolate, acute: spurs thickish, half the length of the corolla, corniculato-obtuse, spreading and ascending at the point: corolla pale blue: lobes ovate mucronate, stigmas small, distinct at the apex.

Pulney and Neilgherry Mountains, common among long grass and about the outskirts of woods in both places.

This plant often attains a considerable size, two or three feet high, and very ramous, becoming altogether a large annual. The specimen figured was selected on account of its small size, as better suiting the space allowed in these plates.

OROBANCHACEÆ.

This is a curious order of parasitic plants, growing on the roots of others, just as Loranths grow on the branches. Though thus corresponding in the peculiar property or power of appropriating to their own nourishment, the juices of other plants, these two families are as widely distinct, in all other respects, as are their respective stations on the plant that fosters them.

The Loranths are woody plants, with green leaves; the Orobanchs have soft herbaceous stems, and, for the most part, brownish white, or yellowish leaves, or rather scales, for they never acquire the development of leaves; in both families there is a tendency to the accumulation of a mass of vegetable matter, just above the union with the supporting plant, as indicated by the large woody masses, occasionally observed on the branches of trees, at the point of union between the parasite and stock. In like manner when Orobanchs are dug up along with their nourishing plant, it is very often found that the supporting root, is not much thicker than a pack-thread, while the base of the attached parasite is as large as a man's fist or larger, with several shoots springing from its surface.

This family, as regards the structure of its ovary, and botanical relations, has given rise to much difference of opinion, Mr. Brown and, I believe, most Botanists, being of opinion that it is strictly in accordance with that of other dicarpellary families, in bearing the placentas on the margins of the carpels, and opening along the middle of the valves, while Dr. Lindley advances the opinion, that the placentas do not appertain to the margins, but spring from the middle of the valves, the line of dehiscence being along the margins. The discussion, in a purely botanical point of view, is a very interesting one, and has been fully entered into in my Illustrations of Indian Botany, but does not seem to me to require being gone into here, beyond simply remarking that for myself I adopt Mr. Brown's views, and in accordance with them, place this order between *Gentianaceæ* and *Cyrtandraceæ*, as agreeing in the structure of the seed with the former, and in the ovary and flowers with the latter. With *Scrophulariaceæ* it also corresponds in the structure of the seed, but differs in that of the ovary. In practice it is easily recognized by its habit, as being made up of "herbaceous, leafless plants, growing parasitically on the roots of other species, having the stems covered with brown or colourless scales." Characters taken from the flowers are variable. Some, as for example that shown in the accompanying plate, have a perfect calyx and corolla, but in others the calyx is obsolete or wanting. The corolla is generally irregular, personate. The stamens are didynamous, usually within the tube, but the anthers vary, being sometimes all perfect, consisting of 2 parallel polleniferous cells, in others, as the accompanying species, one of the cells of each anther is imperfect, and, in place of containing pollen, is reduced to the form of a long pointed spur, while in others it is altogether wanting. The ovary is superior, but, as seen in a cross section, presents considerable differences. For the purpose of acertaining these differences, the best method of proceeding is, to allow the flower to wither or even become quite dry, but without pressure, by which the thick spongy placenta becomes shrivelled. If it be then moistened, so as to become so soft and pliable as to cut without crumbling, the structure is very easily made out. This plan was unfortunately not practised when preparing the accompanying drawing, which therefore does not show the structure, so well as it might have been exhibited. In this genus the inflexed placentiferous margins of the valves

become revolute, and when deprived by partial drying of their moisture, become so shrunk as to give the appearance of being loose in the cells of the ovary.

In its geographical distribution, this family has a wide range, Europe, Asia, Africa, America, and Australia all have their species, but though thus widely distributed, their aggregate number is not great, amounting only to about 120. The number hitherto recorded, of Indian origin, is small, but will, I suspect, as we become better acquainted with their discriminating characters, be greatly enlarged. In the Indian Peninsula, they most abound in alpine regions under the influence of the south-west monsoon, and where they do occur, greatly abound. The one here figured was found among the grass on the sides of the road leading from Pycarrah down the Goodaloor Pass, rather sparingly, but most abundant in the jungles about Mr. Fowler's Coffee plantations. Other species occur in the "Sholahs" or clumps of jungle on the left of the road leading to Pycarrah, flowering most profusely during the prevalence of the monsoon. The large rich blue-flowered species *(Œgenetia pedunculata)* which abounds on the hills at the head of the Bolampully Valley near Coimbatore, and on the Anamullies, I have never met with on the Hills. The *Orobanche,* so common in the Tobacco fields on the plains, seems only to grow on that plant, and, judging from the accounts given of it, its seed would appear to lie for years in the ground quite inert until Tobacco is planted, when it is almost sure to make its appearance on the roots, and doubtless would be productive of vast injury to the crops, but for the rapidity of growth of the foster plant which has for the most part nearly attained a state approaching to maturity before the parasite has had time to do it much injury. Curiously enough, the Natives have an idea that it is a spontaneous production, not propagated by seed, and take no steps for its eradication, which might be easily accomplished by destroying it as fast as it appears above ground, before it has had time to mature its seed. These are produced in such abundance that once, on examining under the microscope a very small quantity of soil, I picked out nearly a dozen of these minute seed; at which rate, a single handful of the earth of the field from which it was taken must have contained, probably, several hundreds. Thus abundant, it is fortunate it only attaches itself to one plant, the Tobacco; did it attack all, promiscuously, the injury would be incalculable. But that it does not attack others is proved by the fact of its never being seen in any but Tobacco fields, whence its native name, "Tobacco fungus." The Cholum or Jowari, and other crops which are sown in succession, altogether escape.

The fact of the seed lying dormant, sometimes for years, between the planting of two Tobacco crops, is curious, and merits, on the part of those who devote themselves to such inquiries, special investigation, as affording a confirmation of a theory which has at different times been taken up and as often cast aside as being deficient in proof. The theory to which I allude is that which attributed the necessity for rotation in Agriculture, to the crop poisoning the soil and disqualifying it for producing a succession of crops of the same species. This theory, which had its run, was soon cast aside as untenable, the true cause, it is now said, being the exhaustion of those particular ingredients on which the various crops respectively feed and which a succession of crops of the same species, so completely removes as at length to cause the starvation of new ones. This latter theory is in the main the more feasible of the two, but the case under consideration seems to render it more probable that both contribute to the result. It appears from the fact stated, that of this Orobanch only appearing in Tobacco fields, that its seed lie dormant

in the intervals between two crops, and hence, that the Tobacco plant must yield some secretion fitted to stimulate into active operation the latent vitality of the seed. This deduction is so self-evident that it seems unnecessary to insist further on it, beyond merely remarking, *en passant*, that if the stimulating properties of the secretions of one plant are necessary towards exciting vegetation in the seed of another, there seems no very obvious reason why they should not prove injurious to successive crops of itself, or one of the same genus or even order. At all events, it is a well known fact that natural forests when, from whatever cause, destroyed, are almost invariably replaced by plants belonging to widely different families.

CHRISTISONIA.

Calyx tubular, quinquifid, equal or sublabiate. Corolla hypogynous, tube funnel-shaped, limb 5-lobed, bilabiate. Stamens didynamous, inserted on the tube of the corolla, all fertile, incluse, or rarely exserted; anthers 2-celled, one polleniferous, dehiscing at the apex by an oblique pore, the other sterile, prolonged into an acute spur. Disk none. Ovary ovate, oblong, 1-celled: placentiferous margins deeply inflexed, revolute within the cell; ovules numerous. Style filiform, simple; stigma bilabiate, or orbicular. Capsule enclosed in the calyx, sub-globose, 1-celled, 2-valved, dehiscing loculicidally, and bearing the placenta on the middle of the valves. Seed numerous, oblong, obtuse, supported on a short thick funiculus; outer seed-coat loose, membranaceous, reticulated, or sub-scrobiculate (pitted like a thimble). Embryo enclosed in copious albumen, orthotropous. Cotyledons short, obtuse: radicle thick, blunt. Herbaceous plants growing parasitically on the roots of other plants. Stems short, simple or ramous, scaly below, floriferous towards the apex; flowers large, rose-coloured, or yellow, or deep purplish blue; pedicels racemose. The following essential character of the tribe and genus is copied from my Illustrations of Indian Botany.

Hyobancheæ. Ovary imperfectly 2-celled, that is, the inflexed carpels only partially meet in the axis; while the placentiferous margins, remaining free and spreading to the right and left, form two broad lamellar placentæ.

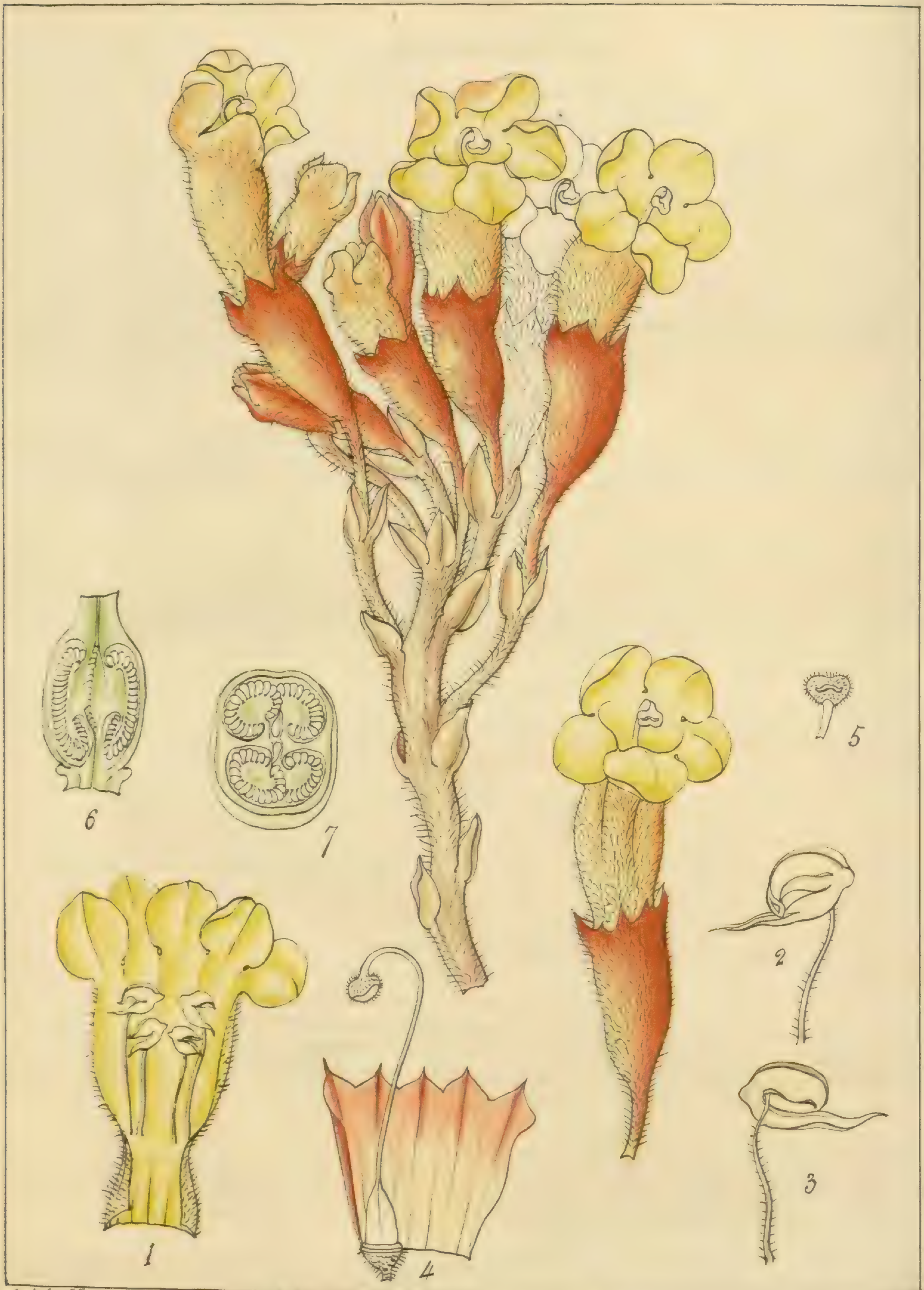
Christisonia. Calyx tubular, 5-toothed. Corolla infundibuliform, sub-bilabiate. Anthers 2-celled, one sterile, subulate. Placentæ free, revolute.

We are indebted to the researches of the late Mr. Gardner of Ceylon, for the separation of this genus from *Phelipæa* with which the few species, previously known to Botanists, had been combined.

When he defined the genus and published it in the 8th volume of the Calcutta Journal of Natural History, he was of opinion that it belonged to the natural order *Cyrtandraceæ*, with which it certainly accords in many respects, and accordingly indicated that as its proper place in the natural system. Subsequent consideration and a more intimate acquaintance with *Orobanchaceæ* led him to coincide with me in thinking it better located in the latter, with which it accords in both habit and structure. It in truth goes far to combine three large natural orders, *Gesneraceæ*, *Orobanchaceæ*, and *Scrophulariaceæ*, to either of which, with the exception of habit, it might be referred.

The species, so far as yet known, are few, about 10, but I feel certain that many others will yet be found. One species, as already mentioned, is abundant on the north-western slopes of the Neilgherries. I have not met with it elsewhere. It comes very near Gardner's *C. bicolor*, if indeed it be not that very species, from which, on recomparison of the drawing with the character, I find it mainly differs in the position or rather direction of the sterile cells of the anther, in mine horizontal, in his erect; a distinction scarcely of specific value. The stigma also seems to differ, but I fear more in words than substance.

He views the stigma as 2-lobed, but with one of the lobes frequently aborting, which I do not think the case; but taking that view, he describes the stigma of his *C. bicolor* as "2-lobed, the upper lobe abortive, the lower flattened, somewhat triangular, emarginate," a character which does not accord with that shown in the plate, which is peltate, umbilicate, somewhat 2-lobed; the lobes slightly emarginate. Not-



Govindoo del. Dumphy, Lith.

Christisonia aurantiaca (R. W.)

withstanding these discrepancies, I am still disposed to fear that I have erred in overlooking the many points of agreement when naming this species, which however may yet, on comparison, be found distinct.

It is to be regretted that plants so curious, and at the same time so exceedingly beautiful, as many of them are, cannot be cultivated, owing to their peculiar mode of nutrition. Many of the tropical *Orobancheæ* are, as regards the flowers, plants of great beauty. The *Christisonias* are in this respect especially deserving of notice, the colours of their flowers being to the full as deep and bright as those of the deservedly much-prized *Torenia asiatica*, and could they only be cultivated, would doubtless become esteemed articles for prize competition. This, however, in the present imperfect state of our knowledge of their habits, seems next to an impossibility, but still as skill and perseverance have before often overcome apparent impossibilities, success, even in such an unpromising case as this, might be found to crown the attempt. I would therefore suggest for the consideration of the present skilful superintendent of the Ootacamund gardens, that he turn his attention to the subject, and having ascertained what plants they select as foster parents, introduce them and then sow the seed of Orobanchs among their roots. I can recollect when Orchids were considered the opprobrium of floriculture, and now every amateur cultivates them successfully; might not the same happen in the case of the more showy of the Orobanchs. Loranthæ are easily propagated, all that is required being to stick, by means of its own viscin, a seed on the branch of a tree and there it takes root. The same may be the case with other parasites and thereby add a new feature to our hothouses.

CHRISTISONIA AURANTIACA (R. W.), erect, sparingly scaly, pilose: scales ovate, appressed, glabrous: flowers corymbose, long peduncled: peduncles bibracteolate near the middle: calyx tubular, pilose, 5-toothed, teeth mucronate: corolla tubular, externally pilose; limb about equally 5-lobed; lobes rounded, spreading: stamens didynamous; sterile cell of the anthers subulate, about twice the length of the fertile one, style exceeding the stamens, exserted, bent at the apex, stigma large, hairy, umbilicate.

Neilgherries, among long grass by the road side leading from Nedawuttim to Goodaloor, also very abundant in the dense jungles surrounding Mr. Ouchterlony's Coffee plantations.

In the former station it occurs in patches of a few plants, but in the latter in masses, covering several square feet. I could not make out the plant on which it grew, or rather I should say it does not limit itself to one species. It rises to the height of 6 or 8 inches, the stems, bracts and bracteols of a dull brownish yellow, the calyx deep reddish orange, tube of the corolla dark yellow, limb bright yellow within. Altogether it is a very conspicuous plant and one which I have not before met with.

CYRTANDRACEÆ.

This is not properly a distinct order—although until recently it has always been viewed as such, and separately described in botanical works—but forms a section or sub-order of *Gesneraceæ*, a much older and better known family. That order is divided into two sub-orders, *Gesnereæ* and *Cyrtandreæ*, the former being almost exclusively of American origin, the latter Asiatic. It is on this latter account, added to the circumstance of this sub-order having hitherto been always treated separately, that I keep up the name here, in preference to adopting the older but, as regards Indian botany, less known name.

The plants composing this family are generally of considerable beauty, and in England many of them are cultivated, and most deservedly prized on that account. The one here given may be looked upon as a fair specimen of our Indian forms. They usually occur growing on moist rocks or in clefts of rocks which have become so far filled with vegetable soil, as to afford accommodation for their roots and ample moisture from the water trickling from above. I have occasionally met with patches of rock moistened by adjacent springs several square yards in extent, completely covered by the spreading leaves of numerous plants, from the centre of each of which rose one or more peduncles bearing a terminal cluster of flowers, similar to those here represented, and forming together a most gorgeous flower plot, such as, in an English garden, would attract universal attention and

doubtless some degree of envy. In addition to these stemless forms, the Neilgherries furnish another genus *(Æschynanthus)* belonging to this family of scandent epiphetical plants, they are shrubby and cling to trees by little side roots like ivy, when in perfection produce abundance of tubular scarlet flowers which are very handsome. In gardens having old trees on which to train them, I should think they would well repay the trouble of culture and training.

It is not easy to assign any external marks by which this family may be distinguished from *Scrophulariaceæ*, an order agreeing in having similarly irregular flowers, didynamous stamens, superior ovary, and in the predominance of herbaceous habit. The Botanist accustomed to minute investigations can, for the most part, easily distinguish them by merely examining a section of the ovary or young capsule, which, in *Scrophulariaceæ*, is 2-celled with the ovules in the centre, while in this it is one-celled, with the ovules on processes, more or less elevated, projecting from the sides, or, in the language of the science, on the inflexed margins of the carpels, meaning thereby that the capsule is composed of 2 leaves, modified to adapt them for that particular purpose, which are placed face to face with the margins turned in and somewhat thickened to form the placenta on which the ovules and seed are borne. This structure is clearly exhibited in two transverse sections in the plate; one shows the ovary and ovules, the other the capsule after it has burst and shed the seed. A similar structure exists, though less clearly shown in the Orobanchs. A reference to *Scrophulariaceæ* will at once show the difference. The seed supplies another distinction, but on account of their small size not easily made out, and unfortunately not shown in the figure of *Didymocarpus*. In this sub-order, when the shell of the seed is removed, the 2 two seed-lobes come into view, that is, they are not enclosed in albumen, while in *Scrophulariaceæ* the bulk of the seed is made up of that substance, as shown in the figure of *Pedicularis*. This is often a most important distinction but less so in the order *Gesneraceæ* than some others, the seed in many of the genera having albumen, while in others, as for example, the whole tribe of *Cyrtandreæ*, it is wanting. The seed of *Æschynanthus* are peculiar, in so far as they are supported on a long very slender thread or podasperm, and are terminated by one or more similar prolongations from the apex. The capsules are also unusual in their great length and mode of opening; and in one genus, *Streptocarpus*, in being twisted like a piece of tape spirally rolled round a stick. Another genus, *Epithema*, which I found far up the ravine at Burlear, is even more curious. It has two large placentæ rising from the base of the capsule, each bearing on the apex, numerous pedicelled oval spirally-twisted seed. In *Jerdonia*, the ovary differs from all the rest of the order, in having 4 parietal placentæ. Figures of all these forms are given in my Illustrations. So far as I have seen, the plants of this order are generally alpine, preferring localities exposed to the influence of the south-west monsoon, where they enjoy during their flowering season a moist climate, as well as abundance of moisture about their roots. *Æschynanthus* is the only exception to the latter selection, for it seeks the support of trees, but there too, it enjoys the benefit of moisture to the roots, through the medium of what is retained in the rough bark to which it clings. *Cyrtandraceæ* are numerous in Ceylon, and the Eastern Islands, also in Assam. In the Peninsula they are less frequent.

I am not aware of any use to which any of the species are applied, but many of them are esteemed as ornaments in the stove and conservatory.

Didymocarpus tomentosa (K. W.)

DIDYMOCARPUS.

Calyx 5-cleft or 5-parted. Corolla funnel-shaped, or sub-campanulate; limb 5-lobed, somewhat irregular, rarely 2-lipped. Stamens 4, of which 2, rarely 4, are antheriferous; anthers reniform. Ovary elongated; style short; stigma orbicular, undivided, often oblique. Capsule siliqueform, 2-valved; valves introflexed; seeds naked, pendulous, smooth. Under shrubs or herbs; caulescent or stemless. Leaves radical or cauline, alternate or often opposite, unequal. Peduncles axillary, ramous, or dichotomously cymose. Flower blue, red, or violet-coloured, or white. The limb is often deeply coloured while the tube is nearly colourless.

Of this very pretty genus De Candolle defines 24 species, but very many more remain to be admitted into our botanical catalogues. Judging from what I possess, contributed by the late Mr. Griffith from his Khassya and Malacca collections, it is my impression that the next revision of the genus will at least double the number. In the Indian Peninsula, so far as I have myself seen, the number is small, four or five, but I have not had opportunities of examining those parts where they are most likely to abound, namely, the Western Ghauts. All that I have found belong to the acauline section, the Malacca and Khassyan ones are principally referable to the cauline. The Ceylon ones, described by the late Mr. Gardner, are acauline and very like the Continental ones; one has procumbent branches.

The specimen, from which the drawing here given was taken, I found on moist rocks near the bottom of the water fall at Kartairy, flowering in February. I have since had numerous specimens brought to me from the hills near Coimbatore; and I saw it in great abundance on the Anamullies in August, but all past flower, though in other respects most luxuriant. I am unable to say how far it may be possible to cultivate a plant requiring a climate and soil so peculiar, but if it can be done successfully, it is well deserving of that distinction. Some of its congeners are established favourites in England where they succeed well in hothouses.

DIDYMOCARPUS TOMENTOSA (R. W.), leaves obovato-spathulate, doubly crenate, reticulately dull whitish tomentose above, densely ferrugeneo-tomentose or woolly beneath: scapes erect, dichotomously cymose, many-flowered, hairy above: calyx 5-cleft, lobes linear obtuse, clothed with glandular hairs: corolla sub-campanulate, 5-cleft, lobes suborbicular: fertile stamens shorter than the tube: ovary about the length of the calyx: stigma dilated: capsule cylindrical, about $1\frac{1}{2}$ inch long, pointed, hairy, splitting along one side only.—Flowers bluish purple.

Alpine situations, forming dense patches in moist clefts of rocks, &c. The specimen figured was gathered at Kaitie Falls on the Neilgherries, in February. I have since received many specimens from hills near Coimbatore, and have often met with it in similar situations.

ACANTHACEÆ.

This is a large and interesting order, very abundant on these Hills. Among its species we find humble herbs, nestling among the grass, low growing under shrubs, extensive twiners, and large shrubs, but I never yet met with a species which could properly be said to aspire to the dignity of a tree. In its distribution it is equally varied; some we find inhabiting salt marshes within low-water mark, others on the plains and sands of the sea-shore on the level of the sea, and others occupying the tops of the highest mountains. Among the latter, we find large shrubs gifted with the curious habit of only flowering once in several years. But when they flower they do so in the greatest profusion. Several of the Neilgherry ones belong to that class, hence I was several years engaged in occasional explorations of the Flora of the Hills before I could make myself acquainted with some of those flowering at long intervals.

The order is a very natural one, so much so that, when a few species have become so well known as to be easily recognized, the rest are readily distinguished simply by habit or family likeness. In nearly all, the leaves are opposite, and the stems thickened

at the point of insertion; the flowers are spicate and each furnished with 3 bracts from the axil of which it springs. The exterior bracts are often large and foliaceous but sometimes reduced to a small size and ending in a subulate point; the flowers are always more or less irregular, the corolla being sometimes nearly regular but the stamens only two or four; in others the corolla is very irregular being ringent, or two-lipped, or one-lipped. The stamens vary in number and size, being two or four, frequently with the rudiment of a fifth which has aborted, showing that were the flowers regular they should have 5 stamens. The anthers, too, vary; they are sometimes normal, that is, the 2 cells are side by side, at others the two are separate, or one is imperfect and converted into a spur; occasionally, as in *Andrographis*, they are furnished with a tuft of hairs; but the most remarkable feature of the family is found in the seed-vessel which is composed of 2 valves, and within furnished with hooked processes to which the seed are attached. The valves open with elasticity (scattering the seed) through the middle of the partition which adheres to the valves, forming a ridge along the middle of each. The capsule is formed of 2 carpels, or modified leaves, the edges of which are inflexed and more or less perfectly meet in the centre, forming a 2-celled capsule, but sometimes there is a division between them. The dehiscence or mode of opening, therefore, of the capsule of this family, is what Botanists call "Loculicidal," or through the middle of cells, in contradistinction to "Septicidal," through the middle of the septum or partition, as is the case with many plurilocular capsules. By this mark their relationship to Bignoniaceæ is made out, many of the species of which have loculicidal dehiscence, but in others it is septicidal. This difference is made use of to divide that family into two principal divisions. When a nearly ripe capsule can be obtained there is no difficulty in determining the order of any Acanthaceous plant, as this kind of dehiscence is constant throughout the family. The seed is variable, sometimes smooth, sometimes rough, and hairy, generally flattened, but sometimes orbicular, but in all without albumen.

The order, as already stated, is a very large one, including, according to Nees' enumeration, 155 genera and about 1500 species. Sometime previous to the publication of Nees' monograph, Lindley gave 105 genera and 750? species as the probable numbers. The history of the order is curious. When first defined by Jussieu, in 1789, seven genera included all the then known species. To these Brown and Willdenow made several additions, but in 1830 they, according to Bartling, only amounted to 20. In 1832–33, Nees Von Esenbeck raised the number, appertaining to India alone, to 56. In 1840, Endlicher gave extended generic characters of 80. In 1847, Nees' monograph was published in De Candolle's Prodromus, and raised the number to 155 and about 1500 species. Since then considerable additions have been made to the species, and a few to the genera. Of genera, the number is excessive, many of those based on distinctions of scarcely generic value, and some on defective observation; the same may be said of some of the species, leading to the inference that the article was hurriedly finished, but notwithstanding these defects, the monograph is truly an excellent one, and worthy of the excellent Botanist who wrote it. Being a very difficult order, I have thought it advisable to illustrate it fully, and have, with that view, published in my Icones figures of about 100 species.

Its geographical distribution is extensive within the tropics, and the warmer regions on either side, Asia, Africa, and America all furnishing numerous species; Australia also contributes pretty liberally to the store, and even Europe is not altogether destitute, the genus Acanthus being found in Greece. With this marked predilection for heat it seems curious that they should so abound on the highest mountains. All the largest and finest

Thunbergia Hawtaniana (Nees)

species seek alpine stations as their favourite places of growth, some even ascending as high as 7000 or 8000 feet on the Himalayas in lat. 30, north, and what seems still more remarkable, we find some species equally luxuriating on the plains, and at an elevation of nearly 6000 feet on the Neilgherries, and others spreading from Cape Comorin up to the banks of the Sutledge.

As regards uses, few of them are of much note, the Creyat, *Andrographis paniculata*, of India being one of the most valuable on account of its intense bitterness. But as ornamental plants, many of them are deserving of note and probably many would be more sought after, if they flowered at shorter intervals. The Thunbergias and cognate genera, being climbers with handsome flowers, are often met with in cultivation, and so are a few others, but certainly too few and too seldom, considering their ornamental capabilities.

MEYENIA.

Calyx small, 5-lobed, enclosed between two large bracteoles. Corolla funnel-shaped, throat large, tube short, closed within with a ring of hairs; limb nearly equal. Stamens 4, didynamous, anthers bearded at the apex, 2-celled; cells of the longer pair unequal, upper ones diverging, tomentose on the margin; of the lower ones parallel, about equal, both muticous at the base. Stigma membranaceous, dilated, bilabiately two-lobed. Capsule tumid at the base, above tapering to a point, 2-celled, 4-seeded, partition persistent, adhering to the axis of the woody valves. Seed globose, attached to spongy cup-shaped processes. Procumbent or twining under shrubs. Leaves opposite, entire: flowers axillary, peduncled; limb of the corolla deep blue, tube brownish yellow.

This genus consists of a single species, which abounds on the eastern slopes of the Neilgherries, below Coonoor and Kotergherry. The plant when in perfection is one of great beauty, and well deserving of extensive culture. It is found to succeed well in the Calcutta Botanical garden, and I dare say might also thrive in Madras.

The figure of the upper pair of anthers, those in the right hand corner of the accompanying plate, is not good, it is incorrect as not properly showing the lower cell, which I now find extends downwards for some distance along the filament, and the short spur represented on the back view, I cannot discover in the dried specimen, though I fancy it is visible in the recent one, otherwise it would not be there. This is one of those cases, perhaps of too frequent occurrence, which proves that no confidence can be reposed in Native observation, however practised the observer, but I am occasionally obliged to repose it from the want of sufficient time to check every point of each plate before sending them to the press. The only other station I have found for this plant is the top of a high hill near Coimbatore, where I found it in great beauty covered with a profusion of flowers in May.

The essential characters by which this and *Hexacentris* are separated from Thunbergia seem rather slight; they are thus given by Nees.

Thunbergia. Fruit capsular. Corolla regular, all the anthers with a single arista at the base.

Meyenia. Fruit capsular. Corolla subregular. Anthers muticous at the base; cells of the longer anthers oblique.

Hexacentris. Fruit Capsular. Corolla regular. Upper anthers 1-calcarate at the base, the lower ones bicalcarate.

These characters seem scarcely of generic value, but they are greatly strengthened by the habit and general aspect of the plants themselves, when compared with each other.

MEYENIA HAWTAYNIANA (Nees), shrubby, procumbent, glabrous: leaves sessile, cordate, acute.

Frequent on the Eastern slopes of the Neilgherries, also on the tops of the Iyamallay Hills near Coimbatore.

The deep purplish blue of the limb of the corolla, and the numerous flowers which open at once, render this a very conspicuous plant and one well worth cultivation.

ENDOPOGON.

Calyx regular, 5-parted. Corolla, in the bud, often convolutely mucronate, bilabiate, throat inflated, upper lip broad bifid, within having a decurrent canal bearded on both sides for the reception of the style, lower lip trifid. Stamens two; cells of the anthers parallel, equal, muticous. Capsule 4-angled, sutures prominent, 2-celled, four-seeded near the base; partition adnate, narrow and incomplete above. Seed either depressed, lenticular, mucronulate with a shield-like depression on both sides near the hilum, or ovate, subcordate, carinate on one side, smooth. Shrubs with serrated leaves: flowers spicate; common bracts opposite, imbricated, broadish, the proper ones narrow. Corolla showy, blue.

This forms one of a group of genera the most perplexing I have ever tried to unravel; they are *Endopogon*, *Stenosiphonium*, *Strobilanthes*, and *Goldfussia*, all of which, so far as characters and habit are concerned, seem to form but one genus, and I can scarcely help thinking that unless better characters than those now assigned, can be found, they must either be united or ever remain a source of confusion and perplexity to the Botanist, as many of the species seem equally referable to any or all of them. While naming my series for publication in the Icones, I endeavoured to limit the three first within better defined boundaries, but fear I have only partially succeeded, and now regret that I admitted *E. Strobilanthes* into this genus, as its being didynamous in place of diandrous furnished a good distinguishing, though very artificial, character, as being opposed to others of nearly equal value. In a conspectus of the genera of the *Ruellieæ*, Nees divides them into two groups, viz.: A. "Stamina duo," and B. "Stamina quatuor." *Endopogon* is placed in the former, *Stenosiphonium* and *Strobilanthes* in the latter; but, as if to show that he attached little value to that mark, he refers a didynamous species to *Endopogon*, and a diandrous one to *Stenosiphonium*. This departure from the conspectus demanded a closer scrutiny of the extended characters of these and some other genera, which led to the conclusion stated above. The following extract from my Icones will explain my views on the subject, to which I may add, in confirmation of them, a circumstance overlooked when writing these remarks, that Nees' *Endopogon decurrens* is said to be sub-didynamous, "Filamenta hirsuta, antheræ breves et latæ, sub-didynamæ," an obscure expression, which however seems to indicate that the author's own mind was not clearly made up as to what were the true limits of these genera.

Endopogon, Stenosiphonium.

These two genera, as they stand in Nees' Monograph, can scarcely be viewed as distinct, though, at first sight, apparently, easily distinguished by the number of their stamens—2 in the former, 4 in the latter. But this distinction Nees has himself broken down by his *St. diandrum*, regarding which he remarks, "ambigit inter Endopogones et Stenosiphonia sed calyx vix usque ad medium divisus;" thus making the essential generic distinction rest on the greater or less depth of the clefts of the calyx, and not on the number of stamens, nor seed in the capsule, or in other words assigning generic value to a circumstance usually esteemed of scarcely specific note. To this high valuation I demur, and therefore in naming the following species, left the calyx comparatively out of consideration, and in lieu thereof made use of the number of seed in the capsule combined with the form of the corolla; viz. a campanulate limb, and long, slender tube, which is common to both.

Endopogon, corolla campanulato-infundibuliform, capsule 4-seeded.—Stamens usually two.

Stenosiphonium, corolla campanulato-infundibuliform, capsule 8-seeded.—Stamens usually four.

Thus the number of stamens and seeds in the capsule divides, into two genera, a group of species which the form of the corolla unites. So far all is easy. But the tetrandrous *Stenosiphonium* has at least one diandrous species, and according to my view, the diandrous genus *Endopogon* has a tetrandrous species in my *E. Strobilanthes*.

Here a new difficulty arises, *Endopogon* differs from *Strobilanthes* in the number of its stamens, and to some extent in the form of its corolla, the latter wanting the long slender tube, the limb being nearly the same in both. In my *E. Strobilanthes* there are 4 stamens, and the capsule is 4-seeded, hence, as regards the stamens and capsule, it is a *Strobilanthes*, with the corolla of *Endopogon*, while the calyx and stamens are those of *Stenosiphonium*. The two nearly allied species, *E. capitatus* and *foliosus*, have the stamens and capsule of *Endopogon* and the calyx of *Stenosiphonium*.

Ought in such a case an additional genus to be constructed for the reception of these 3 plants, which are all so closely allied in habit as to appear inseparable; or are we rather to stretch a point and admit them into one of the already existing 3 genera? The latter has appeared to me the preferable course, hence I have referred them all to *Endopogon*.

They all coincide with *Endopogon* in the form of the corolla and number of seed, and two of them further coincide in the number of stamens, but they all differ in having a 5-cleft, not 5-parted, calyx: but to that I attach only secondary importance. The inconvenience attending this course is the introduction of a didynamous species into a diandrous genus, which, however, is partly palliated by finding Professor Nees introducing a diandrous species into a didynamous genus, so that analogy is in its favour. Influenced by these views, and attaching only specific, or at most, sectional value to the extent of adhesion between the lobes of the calyx, I submit for

Cucujus depressus, Ill.

Endiopogon foliosus (R. W.)

Govindoo del. Drumbry, Tilth.

Endopogon Stachilanthes (R.W.)

the consideration of Botanists, the following diagnostic characters of the three genera just named; the adoption of which will, I apprehend, obviate the necessity of an additional one in an order, perhaps, already overburdened with genera, some of them resting on imperfect observation of the structure on which they are founded. In saying that I think fewer might serve, it can scarcely be necessary to guard myself against being misunderstood in the opinion already expressed, that some of the existing genera may require sub-division, as that does not imply that all the existing ones will be found worthy of preservation.

ENDOPOGON. Flowers diandrous, rarely didynamous. Corolla campanulato-infundibuliform, with a long, slender tube. Capsule 4-seeded.

STROBILANTHES. Flowers didynamous. Corolla infundibuliform, tube short. Capsule 4-seeded.

STENOSIPHONIUM. Flowers didynamous, rarely diandrous. Corolla campanulato-infundibuliform, with a long, slender tube. Capsule 8-seeded.

The first and last differ in the number of seed, the second from both in the form of the corolla.

When this was written I had not studied with much attention the distinctive characters between *Goldfussia* and *Strobilanthes* but on doing so, found them still more obscure than the above. If the genera are really distinct, I feel certain that Nees has misnamed some of the species of both genera, mutually interchanging them, examples of which are given in the Icones.

ENDOPOGON CAPITATUS (R. W.), spikes abreviato-capitate: exterior bracts leaf-like, limb glabrous, the dilated base, calyx, ramuli, and petiols, thickly covered with rigid, glandular hairs: leaves ovate, acuminate, serrated; limb glabrous, densely lineolate.

Neilgherries, flowering March and April.

A large, ramous shrub, flowers pale blue, capsule about the length of the calyx, 4-seeded. In the figure it seems as if two-seeded, that is an error of the artist.

ENDOPOGON FOLIOSUS (R. W.), spikes abreviato-capitate, glabrous: exterior bracts leaf-like; limb ovate, acuminate, serrated: flowers diandrous: leaves long, petioled, glabrous.

Neilgherries, flowering March and April.

In habit and general appearance like the two preceding species, differing from the first in being every where glabrous, and from the second in its capitate not elongated spikes.

The three form a very distinct section of the genus, characterized by their large, exterior, foliaceous bracts.

ENDOPOGON STROBILANTHES (R. W.), spikes elongated, glabrous, exterior bracts foliaceous, oblong, lanceolate, or ovate, acuminate, longer than the calyx: calyx 5-cleft, segments lanceolate: stamens 4-didynamous: leaves broadly ovate, acuminate, serrated, glabrous, lineolate on both sides.

Neilgherries, flowering during March and April.

A large, ramous shrub, each ramulus terminating in a spike of pale blue flowers. In habit and in the foliaceous character, but not in leaf-like form of its exterior bracts, this species quite accords with both the preceding species; it also agrees in the form of the corolla, but differs in having 4, not 2 stamens. When in full flower it is a very handsome shrub.

ASYSTASIA.

Calyx 5-parted, equal. Corolla somewhat funnel-shaped, limb 5-lobed, equal, the upper lobe slightly concave. Stamens 4, didynamous within the tube, approaching by pairs; anthers 2-celled, cells parallel. appendiculate at the base, stigma capitulate, 2-lobed, or 2-toothed. Capsule contracted at the base, rough. often four-angled, 2-celled, 4-seeded, seed attached to processes, discoidly lobed, with a prominent angle at the base. Suffruticose or herbaceous, diffuse or climbing plants; racemes spike-like, one-sided, axillary or terminal; bracts small, equal; flowers blue or lilac or variously tinged with yellow, sometimes handsome.

Of this genus Nees describes 15 species. As a genus it is very natural and well marked by habit, independent of characters. It was on that account I introduced the present species, the only one I recollect meeting with on the Hills, feeling certain that, when one is well known all the others, at least of Southern India, will be readily recognized. Though this is true as regards the genus, I cannot promise as much for the species, as they are indeed very difficult and none more so than the present of which 7 varieties are enumerated as distinguishable. In regard to the one here represented, I am not quite sure that it belongs to any of these seven, if it does, it is to the first, but I rather suspect Nees would have viewed it as a distinct species. It however agrees so well with the character of the species, to which I have referred it, differing principally in the colour of the flowers, which I did not think of specific value, that I thought it better to place it here than make it a new species, which I feared could not be maintained. Nees doubts whether this genus and *Leptacanthus* are sufficiently distinct; for myself I see no reason to doubt it, as I cannot help thinking this one of the most characteristic genera of the tribe to which it belongs. On the plains its species abound, growing in hedges, especially in rich moist soil, and in such situations it is no

uncommon occurrence to see them climbing to the tops of hedges 10 or 12 feet high. In the low country I do not recollect to have met with a white-flowered one, deep lilac verging on purple being here the predominating colour, and then they are most beautiful, but unfortunately only two or three flowers open at once, and these are of short duration. The present, as regards the number and permanency of its flowers, is one of the most desirable forms for cultivation I have seen, and differing to this extent from the usual habit of the genus, led me in the first instance to view it as a new species to which I gave the characteristic name of 'albida,' but on after consideration I thought it but a variety of the already well known species, and named it accordingly.

Asystasia Coromandeliana (Nees), stem ramous, branches diffuse; leaves cordato-ovate, ovate, or suborbicular; lineolato-rough above: racemes axillary, long, secund, straight, calyx lobes acuminate.—Corolla about an inch long, funnel-shaped, yellow at the base. Capsule an inch long.

Slopes of the Neilgherries at a considerable elevation. The species, however, is common all over the country, flowering during the rainy seasons. The specimen represented does not present a characteristic form of the plant; and for some time I supposed it a new species, but the species being variable I cannot find characters by which it can be kept distinct. The flowers in the specimen were nearly white, specked with reddish-yellow spots: lilac is the usual colour.

LEPTACANTHUS.

Calyx deeply 5-parted, lobes narrow, the upper one often longer. Corolla funnel-shaped, limb five-lobed, somewhat unequal, the two upper ones larger. Stamens 4, didynamous not projecting; anthers at first cordate, afterwards oval; cells parallel, contiguous. Style filiform; stigma awl-shaped, curved backwards at the point; ovary 4-ovuled; ovules orbicular, borne on thick processes (retinacula). Capsule oblong, 2-celled from the base, 4-seeded, below the middle. Shrubby or herbaceous plants; flowers disposed in terminal trichotomous panicles, interspersed with small leaves; branches of the panicles opposite. Bracteoles wanting when the lobes of the calyx are very unequal, when nearly equal two, narrow, attached to the base of the calyx. Corolla handsome, blue or red.

So far as known to Nees, this is a small genus consisting of three species. I have however reason to suspect that it must be considerably enlarged, and can scarcely help thinking, that the accompanying species must yet be separated from the Ceylon plant, whose name I have given it. At the time the drawing was prepared and named, I had not seen the perfect fruit. That I have since obtained, and find that it does not agree very well with that attached to a specimen I have of the Ceylon plant. The seed represented on the plate, being some old injured capsules, does not give a very good idea of the perfect form, but is near it. That of the true L. Walkeri is longer, more slender, and less flattened. A careful comparison of the two plants will, I suspect, show other discrepancies, but in the mean time they must be admitted as very nearly allied species if not actually the same. Should they prove distinct, this may be called L. fruticosa, in allusion to its shrubby habit, sometimes attaining to the height of nearly 20 feet, with woody stems nearly as thick as a man's arm.

As the plate will show, it is a very handsome shrub, abundant in the woods between Pycarrah and Nedawuttim, but like many others of the order, labours under the disadvantage, for ornamental purposes, of not flowering annually. I have not ascertained the length of the intervals but feel pretty certain that it does not flower every year. After flowering it seems to die down to the root and spring up afresh, but on this point, too, I can only speak conjecturally, as I judge from the decayed appearance of some plants I saw after flowering, but mention the circumstance in the hope of directing the attention of persons resident on the Hills to it with a view to its elucidation. The following character is taken from Nees' character of the Ceylon L. Walkeri and may not quite correspond. The colour I have assigned is wrong, it ought to have been deep pink approaching to crimson.

Leptacanthus Walkeri (Nees), panicle densely glanduloso-villous: lobes of the perianth linear-filiform, the upper one a little longer: cauline leaves oval oblong, pubescent beneath; floral ones, at least the primaries, ovate, acuminate, small.—Upper branches hairy, leaves with the petiol from 6 inches to a foot long 1½ to 3 inches broad, acuminate or caudato-cuspidate, lacineæ of the calyx narrow, very villous, the upper segment longer, straight: corol 9–10 lines long, cylindrical, ventricose, lobes of the limb subrepand, dark pink, or purplish coloured.

The specimens represented are from the Neilgherries, where it flowered in great perfection during February and March 1846.

Asystasia coromandeliana (Nees)

Sowerby del. Dunphy Lith.

Septacanthus Wallichii (Nees)

Tovendes del. Dumphy, Lith.

Yoldia Lessia tristis (R.W.)

GOLDFUSSIA.

Calyx 5-parted, about equal. Corolla funnel-shaped, limb 5-cleft, lobes obtuse. equal. Stamens incluse didynamous, the lower ones often very short, reflexed; anthers nodding, with the oblique, ovate, membranaceous cells on a hooked glandulose connective. Stigma simple, subulate, irritable, crenate on one side. Capsule six-angled, valves easily separable from the dissepiment, cells 2-seeded; seed discoid supported on retinacula. Shrubs with serrated penninerved leaves, nerves curved, all tending towards the apex, but not reaching it. Flowers few, capitulate, rarely spicate, bibracteolate. Bracts deciduous. Spikes elongating after the fall of the bracts. Capitula peduncled, with the peduncle simple or divided.

Under this character, Nees arranges 24 species, of two of these, I possess authentic specimens both of which are represented in my Icones. A close comparison of the generic characters with those of these species shows several discrepancies nearly as striking as those observable in the plant, which forms the subject of the accompanying plate, and helped to induce me to alter the name from *Strobilanthes* which I first gave it; subsequent consideration led me to doubt the propriety of the change and on again comparing it with both written characters, and the analysis of the true species, I cannot satisfy myself as to which genus it most truly belongs, perhaps to neither, but I think that I would now preferably refer it to *Strobilanthes*. In Nees' list of species, two are from the Neilgherries, taken up from specimens sent to Europe by the excellent Dr. Schmid, but which I have not been able to recognize among my series of Neilgherry *Acanthaceæ*, though pretty complete. My impression is that the characters of both these genera are too loosely constructed, and that both will require to be carefully recast, and further, that from among the present species, one or two new genera will require to be added to give uniformity and consistency to the whole. The genus *Strobilanthes*, as it now stands, is most heterogeneous and complex, but we are not the less indebted to the learned professor for his revision, not merely of the genus, but of the whole of this most difficult order which when he entered upon it was a truly herculean task. Now the labour will be a comparatively light one, a few only of the larger genera requiring to be thoroughly recast. Of the species published in my Icones, I consider *G. Dalhousiæ*, *penstemonoides*, and *decurrens* genuine examples: as already stated, I do not feel by any means certain of the one here given. One circumstance not noticed by Nees in his generic character is the inequality in the size of the two leaves coming off from each joint, a mark which I find constant in all those of which I have specimens, but according to the specific characters not found in all the species. Of two specimens, indeed, of *G. isophylla*, one has them very unequal, the other nearly equal, but notwithstanding that discrepancy I look upon it as a valuable character, while in the perhaps too nearly allied genus *Strobilanthes*, it is so rare that I doubt whether the species, in which it is said to occur, truly belong to that genus.

GOLDFUSSIA TRISTIS (R.W.), shrubby, erect, leaves unequal, elliptico-lanceolate, acuminate, acutely serrated, glabrous on both sides: inflorescence paniculato-spicate; spikes sub-capitate, long pedicelled, drooping, few- (above 2-) flowered, involucrate: involucral leaves or bracts? lanceolate, acute: lobes of the calyx long, ciliate at the apex: corolla infundibuliform, limb regular, tube very hairy within; stamens monodelphous at the base, anthers oblong: capsule 4-seeded; seeds near the base, the lower ones often aborting, upper oblong, obtuse, sub-truncate, pubescent.

Western slopes of the Neilgherries under shade by the road-side, about 2 miles below Sisparrah. Flowering February.

The generic distinction between Goldfussia and Strobilanthes is to me very obscure, and I am unable to say with certainty whether this species belongs to the one or other genus. At first I referred it to Strobilanthes, and fear, on reconsideration, that I have changed for the worse. Leaves with the petiol 6 to 10 inches long, flowers pale blue. Each capitulum, usually only 2-flowered, has 3 pairs of opposite bracts, as shown at fig. 4 of the plate. The pubescence of the calyx is not very well shown in fig. 3, the hairs lengthen as they approach the apex and are there long and matted.

STROBILANTHES.

Calyx about equal, 5-parted to the base; lacineæ linear, somewhat broader towards the apex. Corolla funnel-shaped, the tube not passing abruptly into the limb; lobes equal or nearly so, rarely sub-bilabiate. Stamens four, didynamous, inserted on the middle of the throat, usually within the filaments, united at the base by membrane; anthers oblong, muticous, cells parallel, equal, contiguous, or in some diverging at the base, whence the anthers are sagittate. Stigma subulate, incurved or involute, spongiolose on the back. Capsule columnar, 4-sided, 2-celled almost to the base 4-seeded about the middle; partition thin, incomplete towards the apex, adnate, or sometimes separating from the valves. Seed discoid, angular, with an areola on both sides, the angles more prominent towards the hilum, attached to hooked retinacula. Herbs and shrubs, spikes more or less dense, axillary and terminal, erect, cernuous, or drooping. Bracts foliaceous or foliaceo-membranous, persistent or caducous, exposing the flowers, bracteoles small or sometimes wanting. Flowers, in most, delicate blue or white.

Under this very diffuse generic character Nees ranges 65 species. Some of these ought unquestionably to be removed to form the types of one or two new genera, and it is my impression some others ought to be brought here that are placed in other genera. The character itself is, according to my ideas, much too diffuse, which however is corrected by an abreviated essential character in these terms, "Calyx 5-parted, subequal. Corolla funnel-shaped subequal. Stamens incluse, sometimes monadelphous; anthers straight, muticous. Capsule 4-sided not unguiculate, 4-seeded in the middle. Spikes axillary and terminal, usually compact, broadly bracteate and cone-like, in some loose." To illustrate this genus three plates are given. The first, *S. sessilis*, is I believe a true representative—the second, *S. Wightiana*, ought in my opinion to form the type of a new genus which might include my *S. luridus*, and *S. micranthus*, all readily distinguishable by their peculiar stamens, which are totally unlike those of all the other species I have examined. So long as *S. luridus* was the only one I knew having that peculiarity, I considered it a new genus, but on finding it correspond with one of Nees' species I submitted to his authority, and placed it in this genus, I now think, erroneously. As it now stands, in De Candolle's Prodromus, this is a very difficult genus as regards the determination of the species, which I think might have been to some degree obviated by greater care in their subdivision and grouping, hence the desirableness of having the whole genus recast.

STROBILANTHES SESSILIS (Nees), suffruticose, very hairy, stem erect, 4-angled: leaves sessile, ovate, acuminate, crenate, spikes axillary, opposite and terminal; bracts ovate, cuspidate.—Stems 2–3 feet high, leaves scarcely an inch long, ovate or sub-cordate, crenate: spikes about an inch: calyx about ½ an inch long, the lobes lanceolate, the two lower ones narrower. Corolla about an inch long, varying from pale blue up to purplish. Stamens shortly monadelphous at the base, joined by a membrane. Capsule oblong, smooth, obtuse or somewhat attenuated at the base, 4-seeded in the middle.

STROBILANTHES PERROTTETIANUS (Nees), shrubby, branches reddish, hairy: leaves ovate, caudato-cuspidate, undulato-crenate, hairy, very rough above: spikes axillary, opposite, secund, oval, nodding, dense, hairy; bracts ovate, acute, the interior ones larger, thiner, and coloured; stamens monadelphous.—An erect shrub, 3–8 feet high, thickly covered with brownish-purple bristles, becoming smoother by age: leaves 4–8 inches long, 1 to 2 broad, hairy; peduncles 1–3 inches long, simple or bifid or trifid, naked. Spikes about an inch long, compact, hairy. Corolla pale blue, from 9 to 12 lines long, tube narrow, throat inflated. Stamens incluse, united by a hairy membrane, capsule contracted at the base, compressed, 2-seeded in the middle.

Neilgherries, not unfrequent on the outskirts of clumps of jungle about Ootacamund.

STROBILANTHES LURIDUS (R. W.), a large, ramous shrub; branches virgate, bearing the inflorescence on the lower naked portions: leaves oval, oblong, acuminate, pubescent on both sides, finely serrated; spikes ascending, one or two together, opposite: bracts large, orbicular, emarginate or slightly retuse at the apex, dark livid brown; bracteols linear, obtuse, about the length of the calyx: calyx 5-parted, lobes lanceolate with a row of bristles on the back: corolla 5-lobed, lateral lobes reflexed, hence apparently bilabiate: stamens united by pairs at the base, all equal, exerted; anthers oblong: capsule about the length of the calyx, somewhat compressed, 4-seeded: seed orbicular, glabrous.

Neilgherries, in wood near Nedawuttim. Flowering January and February 1846. When I visited the station in 1847 and 1848, I did not find it in flower though I found the plant in abundance, hence it seems only to flower once in several years. Corolla deep purplish brown, scarcely exceeding the large dull lurid bracts.

I at first considered this the type of a genus near Strobilanthes and proposed calling it, with reference to the stamens, *Didyplosandra*, thinking that they, added to the peculiar habit, were sufficient to constitute this a distinct genus. But on comparing them with those of *S. Wightiana*, a species (of which I had specimens named by Nees himself) with which they correspond, it did not appear that the other differences were of generic value, or such as to call for its separation from that genus as now constituted. My own impression, however, is, that they, and some others to be noticed, ought all to be removed, and the genera *Goldfussia* and *Strobilanthes*, either united or recast on amended characters. As they now stand they can scarcely be said to be distinguishable.

Strobilanthes sessilis (J. Voss)

Govindoo del

Ruellia Perrottetianus (Nees)

Strobilanthes lavatus (R. W.)

Govindoo, del. Dumphy, lith.

Adhatoda Neilgherrica (Nees)

ADHATODA.

Calyx deeply 5-cleft, lobes equal. Corolla ringent, tube shortish, upper lip concave, lower 3-lobed. Stamens 2, inserted below the middle of the tube; anthers 2-celled, cells oblique on the connective one somewhat above the other, the lower ones spurred. Stigma obtuse, capsule depressed! four-seeded in the middle; seeds either lenticular or flat. Herbs or shrubs: flowers various in form: leaves quite entire. Spikes either axillary opposite, or the flowers axillary, or the spikes terminal. Bracts and bracteoles often large, longer than the calyx, flowers either opposite, or, by abortion, one ranked.

Of this genus, Nees, in his recent monograph, in De Candolle's Prodromus, describes 98 species; about 20 of which claim India as their native country. Generally they are inhabitants of the warmer regions within the tropics, hence they are rare on the Hills. The one here being almost the only species found at so high an elevation as Dodabet. It is found all over the higher ranges of the Hills lying flat on the ground, nestling among the grass, if in open exposed situations, but when growing among bushes or under shade, shows some tendency to take advantage of the support and become more conspicuous. It is rather pretty when seen among the deep-green coloured grass to which its cream coloured bracts and light green leaves form a contrast, but apart from these accompaniments, it has little to recommend it to the attention of the florist.

Adhatoda Neilgherrica (Nees), leaves lanceolate, sessile, glabrous, smooth: spikes terminal, 4-sided; bracts and bracteoles ovate, acuminate, venoso-3-nerved, glabrous.

Neilgherries, frequent in pastures about Ootacamund, where it is always in flower. A low procumbent plant, lying flat on the ground, but rendered conspicuous from the grass, among which it grows, by its numerous pale-coloured spikes, which ascend a little above the rest of the plant.

ANDROGRAPHIS.

Calyx deeply 5-parted, equal, lobes narrow. Corolla 2-lipped, upper lobe entire or bifid, inferior trifid, unless when resupinate, when the contrary is the case. Stamens two, anthers two-celled, cells parallel, bearded at the base. Capsule ovate, or lanceolate, depressed, 2-celled to the base, 4- or many-seeded; partition attached to the valves. Seeds oval, obtuse, roundish; obliquely truncated at the base, pitted thimble-like, with a deep hilum. Herbaceous annuals or under shrubs, decumbent or erect, stem and branches acutely 4-angled, racemes axillary or terminal, simple or forked; flowers opposite or all turned to one side. Bracts opposite, shorter than the calyx, bracteoles wanting, or two, minute, at the base of the pedicel; flowers more or less rough or glandular, white or variously purple; lobes of the calyx linear or filiform, capsule linear, oblong, flattened.

Of this genus Nees describes 11 species, but this is not one of them. He separates this and a congener under the name of *Erianthera*, partly on the ground of difference of habit which would have been well enough had the distinction been made to rest on that alone, but that not being the principal reason and moreover *habit* not generally being admitted as of generic value, I do not think it right to admit it here apart from the difference of structure erroneously assigned. The essential distinguishing characters assigned to the two genera rest on assumed differences of the anthers which do not exist, namely, *Erianthera*, "inferior cell of the anthers abortive reduced to a woolly beard." *Andrographis*, "anthers 2-celled, cells parallel, bearded at the base." A reference to the magnified figures of the anthers will at once show that they correspond with the character of the last and that this is therefore a genuine species of *Andrographis*, though differing in habit, and that this therefore, and his other species, can at best form but a section of the genus distinguished by its depressed diffuse habit. The genus *Andrographis*, is so named, somewhat fancifully, perhaps, in allusion to the tuft of hairs on the end of the anthers resembling a camel-hair pencil, and may, I fancy, be translated Pencil-beard. It is an interesting one to the Indian Botanist as including the Creyat, well known as affording a very fine bitter, quite equal to the officinal Gentian, and celebrated as the basis of the French Drogue-amere, an excellent tonic. The Creyat, *(Andrographis* (or Justicia) *paniculata,)* is a very generally diffused plant in the stunted jungle, which covers the low rocky hills so common in the Peninsula, as well as along the bases of all our

greater ranges of mountains. With the exception of this, and another species common in Mysore, the genus consists of erect growing plants the stems of which are acutely 4-sided, with the smallish flowers borne on axillary shoots, generally all turned to one side, some however have them, as in the accompanying, ranged in opposite pairs, along the branch. There is therefore nothing to separate this from them, except its procumbent habit, a view in which I think Nees himself will coincide on re-examining them. This plant is, like the preceding, found nestling among the grass, all over the Hills, but requires to be looked for, otherwise it may easily be overlooked by the unpractised eye. It strikes me, it might with advantage be introduced into gardens from the compact tufts of purple flowers which it forms.

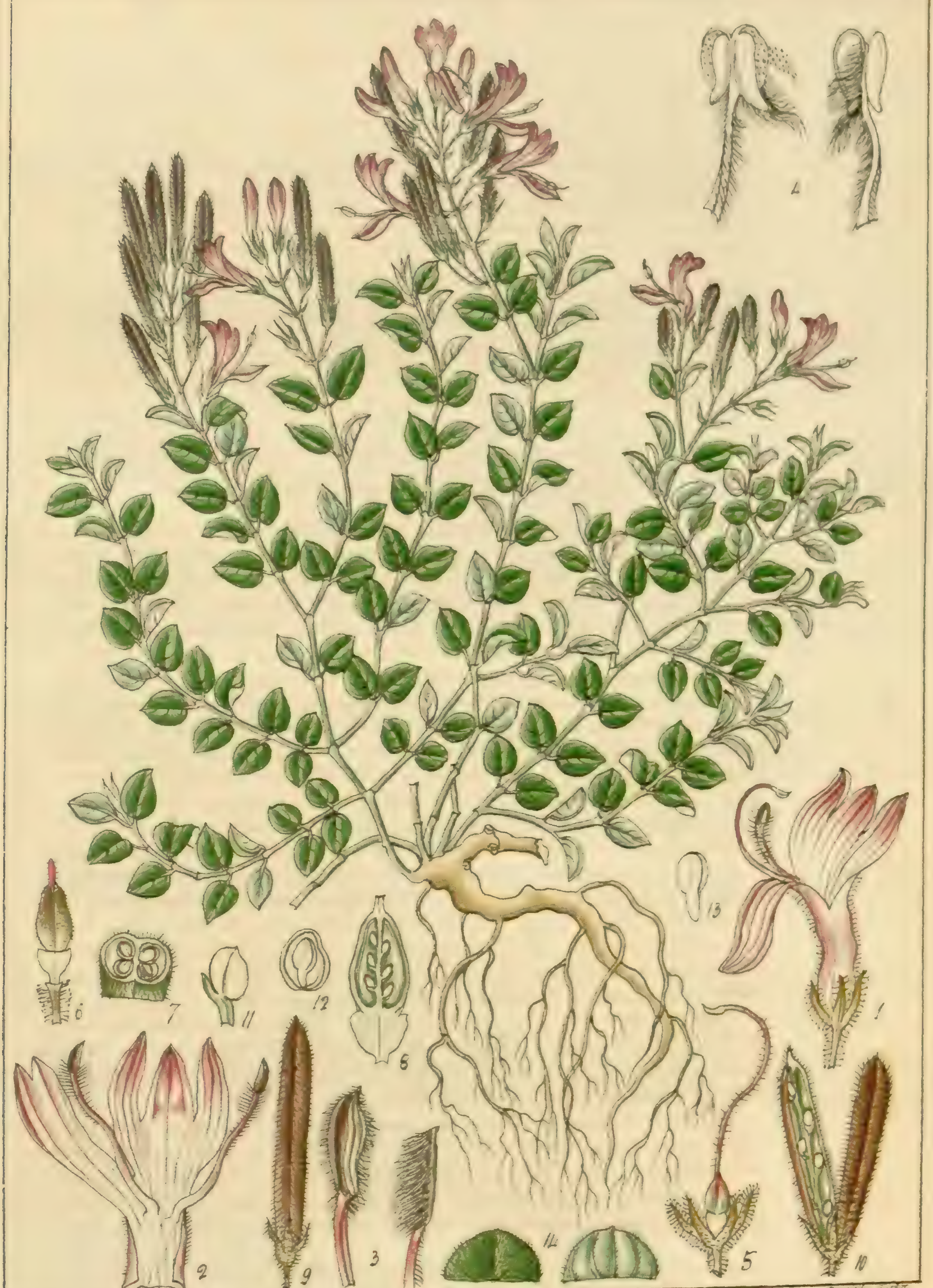
ANDROGRAPHIS LOBELIOIDES (R. W., *Erianthera*, Nees), herbaceous, diffuse, procumbent: leaves sub-ovato-orbicular, mucronulate, flowers terminal, racemose.

Neilgherries, rather frequent in pastures, nestling among the grass, but quite conspicuous from its tufts of brownish purple flowers. Nees has separated this and a nearly allied species from Andrographis under the name of *Erianthera*, on account of the anthers. "Antheræ loculus inferior abortivus in barbum laniformem solutus." As this is certainly not the case in either of the two species, I have taken the liberty of restoring both to *Andrographis*. See plate 517. The tuft of wool in this species is on the back of the connectivum, but not well shown in the figure.

SCROPHULARIACEÆ.

This is one of those families which, from the uniformity of its characters and the vast number of its species, tend to show in a striking light the advantages of the natural system of botany over the Linnean sexual, or indeed any other artificial one. The family embraces upwards of 2000 known species, and nearly 200 genera, all, except one or two genera, having irregular flowers, 2 or 4 stamens, in the latter case usually didynamous, a free 2-celled ovary, axile placenta, and numerous minute albuminous seed. In the sexual system, the species are distributed among four classes, unconnected with each other, and grouped among genera having no relationship with each other. Here, on the other hand, they are all so closely associated that it is often difficult to draw the line between them. The genus *Verbascum*, not unfrequent about Ootacamund, is one of the exceptions referred to above, it having regular pentandrous flowers, and to that extent is more justly referable to *Solanaceæ*, but is necessarily kept here through the medium of *Celsia*, a true member of the order, but which only differs from *Verbascum* in having 4 in place of 5 stamens, so that it might either be viewed as a tetrandrous *Verbascum* or, *vice versa*, *Verbascum* as a pentandrous *Celsia*, hence the affinities, generally, being with the Scrophulariaceæ it is placed in this order. This circumstance is interesting and worthy of notice as showing how orders that are really natural pass into each other. Leaving out the distinctive characters of the flowers, *Solanaceæ* and *Scrophulariaceæ* would become one, but by admitting them into the respective essential characters they are easily kept distinct; the flowers of *Solanaceæ* being regular and symmetrical throughout, while those of *Scrophulariaceæ* are very generally irregular and unsymmetrical. Dr. Lindley, in his "Vegetable Kingdom," lays great stress on this distinction, and on the strength of it separates the two orders to a considerable distance, though thus actually passing into each other by an almost imperceptible transition.

An order so extensive has, as a matter of course, relationships with many other orders besides the one mentioned, but none so very close, with the exception perhaps of *Orobanchaceæ*, several of the species of which have been referred here. Orobanchs differ in habit, all the species being parasitic leafless plants, the stems being furnished with scales in place of leaves, but the flowers and seed are nearly the same in both, the essential



. Andrographis Echioides (R. W.)

difference therefore is found in the ovary which has parietal, not axile, placentas as in true Scrophulariaceæ, a distinction however not always easily made out. *Cyrtandraceæ* is another order which very nearly approaches this, having similarly formed flowers but having, like the Orobanchs, parietal placentas.

This order has a very extended geographical distribution, but most abounds in the northern hemisphere. In India, the number of its species is certainly considerable, though small as compared with the whole order, but then they are found all over the world, extending from the Arctic to the Antartic circle, from Melville Island to Terra del Fuego. In India, they are found in all soils and situations from the sea shore to the tops of the highest mountains, in marsh and on the most arid plains, in the deepest recesses of the forest and exposed to the full blaze of our tropical sun.

With the exceptions of *Digitalis* and the officinal *Gratiola*, the properties of this family are not of much consequence. The former is important as supplying a peculiar narcotic, remarkable for its power of allaying and modifying excessive or irregular action of the heart, while, at the same time, acting as a powerful diuretic. The other *Gratiola* is an active drastic. Many of the species are admired for their handsome flowers and find a place in the flower garden, not the least worthy of which is the *Torenia asiatica*, found as a weed by the road sides on the Hills: though little thought of there, immediately it found its way into English gardens it took its place among the choice prize flowers of their floral exhibitions. Many species of Digitalis have handsome flowers and are very ornamental, while the Snap-dragons and Toad-flaxes are found in almost every garden. Several of the Hill species might be turned to similar account, and growing in their native climate might, with the aid of appropriate culture, become interesting additions to the flower border. *Limnophila hypericifolia*, is a very beautiful species, but inhabits marshy ground and might not perhaps take kindly to the garden, but if it did, and the flowers enlarged under cultivation, and their present lilac colour deepened into blue or purple, which I think probable, as some of the other species have very deep blue flowers, it would become very ornamental, the flowers contrasting favourably with the bright shining green of the leaves. The *Pedicularis* is also well worth cultivation, could it be made to flower at other than its natural season, as it is then too common to meet with much notice in the garden. Another species of the genus, *P. Perrottetii*, which I have never had the good fortune to find growing, but which is found in valleys of the Koondahs, is really a most charming plant, and deserving of every care in cultivation. Its flowers are nearly 4 inches long, and I am told pure white. It ought to be in every garden.

VERBASCUM.

Calyx deeply 5-cleft or 5-parted, rarely 5-toothed. Corolla spreading, wheel-shaped, rarely concave, lobes somewhat unequal. Stamens 5, the three posterior ones, or all, woolly, rarely naked. Style flattened at the apex, thickish. Capsule globose, ovoid, or oblong, dehiscent. Herbs, usually biennial, rarely perennial or suffruticose, usually erect, tall, more or less tomentose, or covered with fleecy wool. Leaves all alternate, the radical ones usually large, long-petioled, the cauline ones progressively shorter, more sessile or decurrent. Corolla ephemeral, yellow, brown, purple, or red, rarely white.

Of this vast genus, including nearly 100 species, 4 only are found in India, and two of these common to Europe, so that one might almost suppose they had been introduced with grain seed and become naturalized. In general appearance they so greatly resemble *Celsia*, one species of which is also found on the Hills, that they might almost be mistaken, but are generally easily distinguished by the flowers,

Verbascum having 5, *Celsia*, 4 stamens. *V. virgatum* often attains a great height. I have measured plants upwards of 8 feet high, and believe that taller ones may sometimes be met with. It is interesting in connection with the climate, as showing how much that of the autumnal months of the Hills assimilates with that of summer in Europe.

VERBASCUM VIRGATUM (Withering), stem subviscoso-hispidulous or glabrous at the base: leaves oblong, glabrous, or glanduloso-hispid beneath; the inferior ones petioled, dentate, or sinuato-pinnatifid; the superior ones sessile or cordato-amplexicaul, or shortly decurrent: racemes glanduloso-hispid; pedicels 2 or 3 together, rarely solitary, shorter or about the length of the calyx: filaments clothed with violet-coloured woolly hairs (violaceo-lanatis).

Neilgherries, frequent, flowering during the rainy season.

This plant not unfrequently attains the height of from 6 to 7 feet, though from 3 to 4 is the more common size. Flowers yellow, nearly sessile, the short bent filaments densely clothed with purplish-coloured, woolly hairs.

LIMNOPHILA.

Calyx deeply 5-cleft, or parted, equal or with the posterior lobe larger. Upper lip of the corolla emarginate or 2-lobed, the lower one 3-lobed; throat not plicate, stamens 4, incluse, cells of the anthers separate, oblong, often stipulate. Style deflexed at the apex, dilated, entire, or shortly bilamellate, often two-winged at the flexure. Capsule ovate, globose or compressed, the valves splitting along the back (loculicide bivalvis) the valves afterwards 2-parted; the slightly inflexed margins separating from the broad placentiferous partition. Tropical, herbaceous, marshy or aquatic plants, often punctuate with pellucid glands, leaves opposite or 3–4-verticelled, the lower submerged ones in aquatic species capellacio-multifid. Flowers oblong, axillary, or the upper ones disposed in a leafy raceme, the calyx often bibracteolate.

Of this genus Mr. Bentham has described 22 species, 20 of which are natives of India; the other two are from Java. This therefore is almost a purely Indian genus but is not confined to India, several species being found in other countries, the Eastern Islands, Java, Australia, &c., a common occurrence in the case of aquatic plants, many of which occupy a very extended geographical range. The specimen here represented grew in some swampy ground in Kotergherry, attaining the height of between 3 and 4 feet, flowering in August and September. It is a pretty plant when in full flower but loses its beauty as the seed advance towards maturity.

LIMNOPHILA HYPERICIFOLIA (Bentham), glabrous, rooting at the base, ascending: leaves sessile, ovate, oblong, obtuse, cordately semiamplexicaul at the base; the floral ones smaller: racemes terminal or axillary: flowers sessile, becoming remote: calyx deeply 5-cleft, divisions lanceolate, the posterior one larger.—Herbaceous, repent at the base, scarcely branched, 1–2 feet high. Leaves about an inch long, punctuate. Corolla 7–9 lines long. Style winged at the bract with 2 acutish falcate auricles. Capsule short, valvate, bifid.

Kotergherry, Neilgherries, in swampy ground, flowering in August.

PEDICULARIS.

Calyx tubular, or campanulate, more or less cleft in front, 2- or 3-toothed at the apex, teeth rarely equal, the lateral ones connate or free, cristato-dentate or entire, the middle one usually the least or sometimes wanting. Tube of the corolla cylindrical or more or less enlarged at the throat, the hood compressed, obtuse, entire, or furnished with a tooth on each side, or prolonged into a truncated or bidentate beak: lower lip often two-crested, 3-lobed, lobes spreading or deflexed, the middle one smaller, exterior in æstivation. Stamens didynamous, concealed under the hood, filaments often hairy towards the base: anthers transverse, approximated by pairs, cells equal. Capsule compressed, ovate or lanceolate, more or less falcate or oblique, especially at the apex, spliting along the back from the apex, to near the base, and for a short space in front, the valves bearing the partition. Seed in the lower part of the capsule attached laterally, ovoid, rather large, the testa loose or closely attached, foveolate or smooth. Embryo small, radicle pointing to the apex. Herbs, usually alpine, leaves alternate or verticelled, rarely opposite, in most pinnatifid or rarely simply dentate, decreasing in size from the radical to the floral ones. Flowers spicate, bracteolate; floral bract-like leaves like the cauline ones.

Verbascum virgatum (With.)

Limnophila hypericifolia (Benth.)

Pedicularis zeylanica (Benth)

Under this very extended generic character, Mr. Bentham ranges 109 species. The genus is a most natural one, so much so, that out of so large an assemblage only seven plants are excluded as having been erroneously referred, a truly rare case, especially in genera of such ancient date, this being a Linnean one. Like all very natural, large genera, the discrimination of its species is attended with much difficulty. The one here represented is so variable, that it might almost be split into two or three for being generally distributed in both humid and dry soil, it assumes very different forms according as it grows in the one or other, sometimes quite erect, as in the specimen selected by the artist, at others ramous, all the branches lying flat on the ground without any central shoot. It also varies more or less in the depth of colour of its flowers. In all its forms however the hood or helmet (galea) is blunt or without a beak. There is another nearly allied Himalayan species, but not, so far as I have observed, found on the Hills, having the apex prolonged into a tapering beak, a character by which it is at once distinguished from this. Of the 107 species belonging to the genus, 20 only are natives of India, mostly from the Himalayas. Two are indigenous on the Neilgherries, one of them only found there, the other, *P. zeylanica*, has a wider range, being found on other hills and in Ceylon.

When dried for the herbarium they lose their colour and change to a dirty black.

PEDICULARIS ZEYLANICA (Benth.), furfuraceo-pubescent, or rarely nearly glabrous; loosely ramous at the base; branches ascending or erect: leaves petioled, oblong, obtuse, doubly crenate: racemes capitate or elongated: calyx cleft along one side, cristately 2–3-toothed behind: tube of the corolla shortly exserted; helmet incurved, obtuse, erostrate. —Except in the helmet, this species is very nearly allied to P. carnosa, in that it is beaked in front, in this obtuse, beakless. This species which is very abundant on the Neilgherries is, when in perfection, a truly beautiful flower. It varies considerably in its habit, growing, as in the instance selected for representation, quite erect, and having very few branches, even at the base, or loosely diffuse without any central stem, only a number of loose, procumbent branches, springing on all sides from the crown to the root, each ascending towards the apex and terminating in a more or less elongated raceme of beautiful pink flowers. It commences flowering in June and July and continues until the end of the rains.

SOLANACEÆ.

This is a large and in many respects an interesting family, on account of its peculiar properties. As already remarked it very nearly coincides with *Scrophulariaceæ* in its botanical characters, mainly differing in its regular pentandrous flowers, these, in *Scrophulariaceæ*, being irregular with either two or four didynamous stamens. The ovary is the same in both, but the fruit is not equally uniform, being in some genera of *Solanaceæ*, baccate, and in others capsular, while in the other it is almost always capsular. But as regards properties they are very different, those of *Scrophulariaceæ* being, with a few exceptions, of small note, the plurality being nearly valueless to man, while those of *Solanaceæ* are in many instances highly energetic, furnishing, according to their mode of application, valuable remedies or deadly poisons. To this order we are indebted for Hyoscyamus, and Belladonna, two most valuable narcotics. To it also belongs the mischievous Datura, the narcotic properties of which are but too well known in India, but scarcely enough known to the Physician, since it is probable that if they were better known to him, he would find preparations of this plant in some cases even more valuable than either opium or henbane in inducing sleep in cases of extreme watchfulness and irritability. Its antispasmodic power in relieving asthmatic fits have been long known, but not much relied on, as it is seldom prescribed, perhaps from the uncertainty of its action. It is more used in India than Europe for this purpose, it being one of the native remedies often used for the palliation, at least, of this distressing disease. The most generally and extensively consumed plant of the order is perhaps the Tobacco, the facinating qualities of which in form of smoke and snuff have made it an almost universal favourite, with all classes and

conditions of men, though well known to be a most energetic poison when received into the intestinal canal. I have known a child deprived of life in a few minutes from the administration of a too powerful Tobacco enema. The berries of the Bittersweet *(Solanum dulcamera)* are also intensely poisonous as proved by the frequency of fatal consequences to children who have ignorantly partaken of them. To set against these, this family furnishes the Potatoe to the world at large, and the Brinjal to the tropics and warm latitudes on either side, as nourishing esculents, equally prized by rich and poor; the so-called Brazil cherry *(Physalis Peruviana)*, as a fruit, and the Capsicum as an equally generally esteemed warm condiment with which to season the insipid vegetable diet on which Natives of tropical countries so largely subsist. And, lastly, it gives us the delicate Tomata the delight of the genuine Epicure. These examples show how largely mankind are indebted to this family for medicine, food, and luxuries: and, as if unwilling to leave any of his wants unprovided for, Brazil furnishes a Solanum which the inhabitants consider equal to the true Cinchona, in curing their fevers.

This order contains about 1200 described species, but there are very many more collected in herbaria still undescribed, but which I presume we may ere long hope to see brought to light, through the medium of De Candolle's Prodromus, when the monograph of the family appears in that great work, but which, unhappily for science, it has not yet done. Of the named and described species, nearly 100 belong to the Indian Flora, but many of these have been reduced to the rank of varieties by Professor Nees Von Esenbeck in a monograph of the Indian Solanaceæ, published about 16 or 17 years ago in the Linnean Transactions. Whether future Botanists will adopt these reductions remains to be seen.

In its geographical distribution it occupies a wide range, extending from the tropics through both temperate zones, but are most abundant in the warmer regions. In India the species are not numerous, though individually abundant: they are found in nearly all situations in shade and sun-shine; in low moist grounds and elevated parched ones; on heaps of rubbish and in the best cultivated gardens, on the sea shore and tops of the loftiest mountains. Of the Peninsular ones none seem prized as ornamental objects, though the Datura, were it a less common and dangerous neighbour, might, on account of its large handsome trumpet-like flowers, merit a place in the shrubbery, the more so as it shows a strong tendency to become double, often presenting three or four corollas one within the other, like graduated sets of chemical test tubes. The Petunias are generally admitted into gardens and are deservedly prized as ornamental objects.

SOLANUM.

Calyx 4–5–8- or 10-cleft or toothed, persistent. Corolla rotate or rarely campanulate, plicate four- or five-cleft or sinuately angled. Anthers connivent, opening at the apex by two pores, equal, or sometimes the lower ones larger. Berries two- or rarely several-celled, many-seeded, naked. Seed glabrous, reniform. Embryo curved spirally round the edge enclosing the albumen. Herbs, shrubs or trees, unarmed or furnished with prickles, glabrous or hairy, the hairs sometimes stellate: leaves alternate, solitary or in pairs, one usually smaller, entire or variously divided: flowers above the axils lateral or rarely terminal, solitary, paired, fascicled or umbelled, racimose, cymose, or corymbed, rarely panicled; corolla white or purplish rarely yellow.

This as it now stands recorded in Walper's Repertorium Botanicum and Annals is a genus of vast extent, including about 600 species and as may be surmised from the conclusion of the generic character

Solanum ferox-minus, Rees.

is most polimorphous in its aspect, so much so that I can scarcely suppose that all the species now referred to it will long be permitted to retain the name; still less can I suppose that all its present interminable list of species will be retained, when once taken in hand by a competent Botanist with adequate materials for the determination of what are and are not good species. Nees, by being provided with such a series, was enabled to reduce those of the Indian Flora, by nearly a half. Previous to his examination it was a task of the most irksome kind to determine any species from a dozen specimens taken from as many different plants, as among them representatives of several could usually be found and then it was impossible to say which was the right one. The case is now altered, it being about as easy to make out the species of a Solanum as of any other genus, except in one or two instances where he seems to have carried his retrenchments a step too far. This I suspect is the case in the example I have selected to illustrate the genus. But whether or not I am in error in this supposition, I feel certain that the plant represented is correctly named, according to his list. It is common in woods about Ootacamund.

Solanum ferox (Linn.), perennante-herbaceous, woody at the base: leaves paired, cordate, sinuately angled, woolly tomentose and prickly on both sides: peduncles intra-foliaceous and, like the short pedicels calyx and berries, hairy.

Courtallum, flowering August and September, and Neilgherries always in flower.

Solanum ferox, minus. (Nees.)

Neilgherries.

Nees Von Esenbeck views these two forms as but varieties of the same species. I think there is room for dissenting from that view, but yet, I for the present adopt it, as my opportunities of examining the correctness or otherwise of his opinion have not been such as to satisfy me on the subject. One circumstance is worthy of note, namely that the former of these plants, No. 1399, has not, so far as I am aware, been met with on the higher range of the Neilgherries, while the other is quite common. That difference of habit, combined with its glabrous fruit, causes me to doubt the correctness of Nees' decision in this instance.

CONVOLVULACEÆ.

This is a large and beautiful family, many of the species of which are very deservedly much admired for the elegance of their forms and the richness of the colours of their flowers. Most of those found on the Hills are rather defective in these particulars being, for the most part, large coarse-growing plants and the flowers, without sufficient variation in their colours, a rose pink being the predominating one. The one here given is the only species of *Convolvulus* I have met with, the others belonging to the genus *Argyreia*. The difference in generic characters between these two genera is not at first sight very conspicuous, and requires the aid of magnifying glasses to detect, as being found in the ovary and stigma. In this the style splits at the apex into two linear stigmas and the ovary has 2 cells, with 2 seed in each, while in *Argyreia* the style terminates in 2 rough globular heads and the ovary has 4 cells, with one seed in each. A more easily detected distinction is found in the fruit which, in Convolvulus, is a dry capsule, in Argyreia a fleshy berry. This last, the baccate fruit, is a peculiar feature in this order, and serves to unite into one group 3 genera which, when thus separated from the rest, are easily distinguished from each other by these brief characters. *Rivea* has two prolonged stigmas like *Convolvulus*, and a 4-celled ovary, to which may be added a long narrow-tubed corolla. *Argyreia* has a capitate 2-lobed stigma and 4-celled ovary, with a short tubed campanulate corolla. *Lettsomia* is like Argyreia but has a 2-celled ovary, with 2 ovules in each cell, to which may be added that the stamens are sometimes longer than the corolla and exserted. This last however is not constant. The genus *Ipomœa*, which is a very large one and very common in India, is distinguished from the last by the fruit only. It has a dry capsule which splits into two halves, has 2 cells and 4 seed, capitate 2-lobed rough stigma; a campanulate corolla is common to both. By these simple marks these four genera which contain the bulk of the species of this family, found in India, are readily distinguishable: the species, which are numerous, are of difficult discrimination.

The family is very widely distributed over the world, but very decidedly predominates within the tropics and warmer portions of the temperate zones. A few, however, extend almost to the confines of the frigid zones. Three are natives of England, and several others of Europe.

The properties of this family are somewhat peculiar; one species yields the well known sweet potatoe of India; another, the still better known Jalap of the druggist; and a third the Scammony. The two last are natives of America, and, what is remarkable, a variety of the Jalap plant yields large tubers which have lost the cathartic property of the species and are used as food. The roots of *Ipomæa turpethum*, an Indian species, possesses properties similar to those of Jalap, and are in use among the Natives as a substitute for that medicine. Several other species are used medicinally by the Natives, and a very large and handsome plant has got the name of snake-creeper, under the impression that snakes will not approach it! a foolish fancy, as I have seen snakes taking shelter under the abundant cover it affords for their concealment to such an extent that I was obliged to destroy a handsome arbour of it to get rid of them. Many of the species are cultivated for their beauty; two, known under the name of scarlet creepers, species of the genus *Quamoclit*, are much prized for arbours, but, like many of the family, labour to some extent under the disadvantage of early dropping their flowers. The moon flower *Calonyction speciosum*, formerly *Ipomæa bona-nox*, is quite remarkable on this account, opening its large handsome flowers about sun-set and dropping them a little after sun-rise, whence the name "good-night flower." One of the most highly prized of the family for its ornamental qualities is the *Pharbitis Nil* which, in its native state, has rich blue flowers, but under cultivation becomes beautifully varigated, with the further advantage of retaining its flowers nearly the whole day.

CONVOLVULUS.

Sepals 5. Corolla campanulate. Style 1, stigmas 2, linear, cylindrical, often revolute. Ovary 2-celled with 4 ovules, capsule 2-celled. Herbs or shrubs.

Under this character M. Choisy gives characters of 117 species, several of these however imperfectly known. Of that long list the only one I have ever seen on the Neilgherries is the one here represented, which is a comparatively decumbent plant twining among grass, and though, when examined, not destitute of beauty is yet most modest and retiring in its habits. Were it introduced into the garden and made to twine on low bushes so as to bring its delicately-coloured flowers to light, I cannot help thinking it would soon find a place in most gardens, to the exclusion perhaps of some of the exotics, which require much more care and are less deserving of it than this, and many other native plants, which I am most certain would be highly prized in English gardens, though so completely neglected in their native country. It is to be hoped a change in this respect will ere long come over the tastes of European sojourners, on these health-giving mountains, and especially of permanent residents, proprietors of houses and gardens.

CONVOLVULUS RUFESCENS (Choisy), stems rusty red: leaves hastato-cordate, acute at the apex, mucronulate; sinuate on the margin, 2 inches long, the auricles crenato-lobate; petiols 7 lines long: peduncles short, 1–3-flowered: bracts minute: pedicels 3–6 lines long: sepals ovato-acuminate, ciliate, acute, 3 lines long; exterior ones pubescent: corolla 5–6 lines long: capsule glabrous.

Neilgherries, not uncommon.

A procumbent plant, spreading to a considerable extent among long grass.

Convolvulus rufescens

BORRAGINEÆ.

This, as it now stands in De Candolle's Prodromus, is a large and complex order, and viewed as a whole is one admirably adapted for giving scope to disquisitions on natural affinities and what ought to constitute the limits of natural orders, and especially on the value we ought to assign to the characters we select for their circumscription. Such being the case it has naturally given rise to considerable difference of opinion, among Botanists, on these subjects; some agreeing with De Candolle in viewing the whole as one order, but divisible into several tribes or sub-orders; others esteeming these tribes as entitled to rank as distinct orders, but disagreeing as to the genera that ought respectively to belong to each. In a word, it threatened to become a chaos, when the elder De Candolle undertook its revision for his immortal Prodromus. Aided by rich collections and with the opinions of all his predecessors before him, he finally arrived at the conclusion that three orders, which others had constructed, formed but one, which he thought could not be divided. Under this conviction he reunited the separate parts under one ordinal name, but still retained them so far distinct, as to constitute tribes or sub-orders of them. In this distribution, I am quite prepared to follow him and feel all but certain that, for the future, others will do the same, as even then, it is not more complex in its composition than *Loganiaceæ* or *Verbenaceæ*. But supposing that in this I am mistaken, and that it is divided, then I think it must be broken either into two or four orders, not three, as has hitherto been done.

The higher ranges of the Neilgherries furnish representatives of three of these tribes, the fourth, *Cordieæ*, I have not seen at any considerable elevation. The three accompanying plates only represent two of these tribes, two of them belonging to one, but they represent extreme forms, the first forming the type of the tribe *Ehretieæ*, the second the extreme genus forming the transition to *Heliotropeæ* and in some of its species scarcely distinguishable; the third appertains to the tribe *Borrageæ* which more properly constitutes the European division of the order, distinguished from the other two by the ovary, and fruit, aided by the position of the style. In the former it springs from the top of the ovary, in the latter it descends between the carpels and seems to be a prolongation of the pedicel of the flower, round the base of which the carpels, or cells of the ovary, are placed.

Viewed as a whole, the order, like those above-mentioned, is complex, but upon the whole, though presenting great variations of form, natural. For example, we find among its species handsome trees, low shrubs, and some very humble herbaceous plants, thus furnishing all forms of vegetation, but still a family likeness is seen to pervade the whole. In its geographical distribution it occupies a wide range, extending from the equator to either polar circle, but in that it is not singular. The flowers are generally bisexual, but sometimes in *Cordieæ* dioicous, usually they are quite regular, but in some of the species of *Borrageæ* they show a tendency to irregularity in the form of the corolla, but even in the most irregular, there are 5 stamens. The ovary, as seen in a cross section, is four-celled, but composed of only two carpels, the edges of which are folded in and bearing an ovule on each edge. As the fruit approaches maturity they become hard and nut-like, and in the tribe Borrageæ separate from each other, leaving the remains of the style adhering to the base of the flower.

This last forms a distinction so marked from the preceding sections, and there is moreover a difference of habit, that it might well enough entitle it to rank as a distinct order, but the rest are better kept together as one. The differences between Cordieæ and Ehretieæ is much insisted on by many Botanists, and are no doubt considerable, but certainly not so great as we find between the different tribes of Verbenaceæ.

As regards properties, they are not of a high order. The Cordias and Ehretias sometimes attain sufficient size to furnish timber. The roots of a species of the latter are used by the Natives as a substitute for Sarsaparilla, and some of the herbaceous forms are used medicinally, but possess no active property. A few of the European species are admitted into the flower garden as ornaments, among which is the little Forget-me-not (*Myosotis palustris*) a species of *Borragao* and an *Echium*, but the finest of all is the fragrant Heliotrope, *H. Peruvianum*, now so common on the Hills.

EHRETIA.

Calyx 5-lobed, lobes valvate in æstivation. Corolla salver-shaped, or somewhat wheel-shaped, that is, the tube either long, cylindrical, or very shortly sub-campanulate, lobes ovate, imbricating in æstivation. Stamens 5, filaments awl-shaped, anthers ovate, 2-celled. Style filiform, 2-cleft; stigmas headed or acute; ovary 4-celled, with a pendulous ovule in each. Berry fleshy or dry, sometimes with 2 two-celled, or 4 one-celled nuts, or sometimes all united into a single 4-celled nut, seed pendulous; albumen sparing or none; embryo axile, radicle cylindrical, about as long as the cotyledons. Shrubs or small trees: leaves alternate or fascicled, entire or serrated: flowers usually corymbose: corolla white.

De Candolle describes 58 species of this genus distributed under four sections. These sections are so far dissimilar from each other, that he asks, at the conclusion of his generic character, whether the genus might not be divided into as many genera as it now has sections. I certainly cannot answer the question, but I do know that the species of some of the sections are very unlike those of the others, and, without close scrutiny, such as one would not readily suspect belonged to the same genus. The one here given is barely entitled to a place in this book, as I do not recollect of having seen it above Coonoor, and I am not quite certain of having found it even so high as that. It is introduced as assisting to illustrate the differences above adverted to, in the remarks on the order. The species, if this is indeed Roxburgh's plant, is rather widely distributed as the specimens from which the species was first named were obtained from the subalpine jungles of the Northern Circars.

EHRETIA LÆVIS (Roxb.), arborious, glabrous: leaves petioled, from oval to oblong lanceolate, acuminate at both ends, smooth, shining above: corymbs axillary, dichotomously many-spiked: pedicels and deeply 5-cleft calyx slightly hairy: corolla rotate, lobes reflexed: stamens exserted.—Leaves from 3 to 6 inches long, from 1½ to 3 broad; petiols from ½ to 1½ inches long, axils of the vein sometimes hairy or furnished with a gland: flowers subsessile, secund on the numerous circinate spikes: drupes about the size of a large pepper-corn; red when ripe.

Neilgherries, on the eastern slopes, flowering during the cool season, December and January.

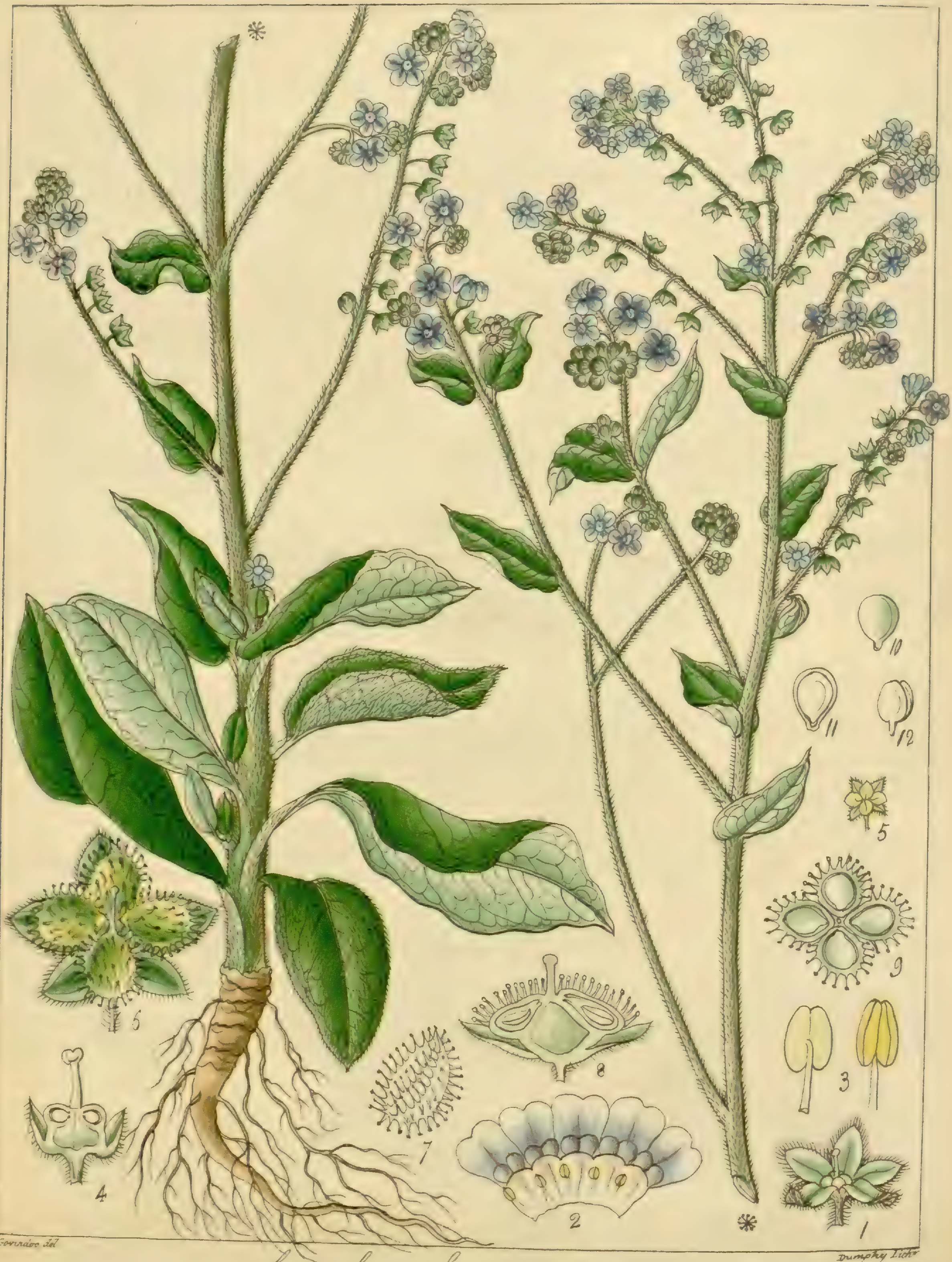
TOURNIFOURTIA.

Calyx 5- rarely 4-parted. Corolla salver-shaped, throat naked. Stamens 4–5, within the tube. Stigma entire or 2-lobed. Fruit 2-carpelled, carpels sometimes undivided, the nuts 2-seeded, or 2–3-celled, sometimes 2-parted, and then four nuts are formed with one seed in each; radicle superior, short, cotyledons flat, ovate. Erect or scandent, herbs and shrubs; leaves alternate, petioled, entire, rarely, nearly opposite or sessile or serrated spikes with the flowers all turned one way, ebracteate, often cymose; corolla white or yellowish.

Garindoo, del. Dunphy. Lith.

Ehretia laevis (Roxb.)

Tournefortia reticosa (R. W.)



Cynoglossum furcatum (Wall)

This, like the preceding, is a large genus, including 100 species, only 10 of which are said to be natives of India. Of these I have only seen some three or four, and have only studied two. They appear so unlike each other as to lead to the impression that they might be divided into two genera, and actually were so formerly, but are now united, showing that they cannot well be kept distinct. The one here represented I found in woods below Nedawuttim, climbing among bushes to a great extent, but only apparently in fruit, nearly every flower having become the nidus of an insect. The parts still grew, but, on cutting open the apparent fruit, they were found to contain minute caterpillars in place of seed.

TOURNIFORTIA RETICOSA (R. W.), shrubby, climbing: branches terete and with the under surface of the leaves sparingly covered with short appressed pubescence: leaves short petioled, ovato-lanceolate acuminate, acute, round at the base, dark green above, pale beneath and marked with a delicate net-work of brownish purple veins: peduncles leaf-opposed, dichotomous; branches divaricating, spikes corymbose, circinate: calyx 5-parted, lobes ovate, hispid: corolla 4 or 5 times longer than the calyx, hairy, obtusely 5-lobed: stamens 5, inserted near the base, included: fruit ——.

Western slopes of the Neilgherries, below Nedawuttim, flowering in April, and in Coorg, (Jerdon).

A large climbing shrub. One I saw was 10 or 12 feet high: leaves 4–6 inches long, about 1½ broad, sparingly sprinkled with hairs above, pubescent beneath. What I gathered as fruit proved on examination the nidus of an insect. This species seems most nearly to approach T. viridiflora, but is quite distinct, as shown at once by the comparatively large flowers and small calyx.

CYNOGLOSSUM.

Calyx 5-parted. Corolla funnel-shaped, 5-lobed, tube about the length of the calyx, throat closed with vaulted scales, lobes very obtuse. Stamens within the tube. Stigma entire or emarginate, nuts imperforate at the base, attached round the base of the style, convex or depressed, not furnished with a wing-like margin, either echinate all over, or on the margin only, at maturity separating from the base to the apex, the apex long adhering to the style. Seed hanging, cotyledons obovate, much longer than the radicle. Herbaceous plants: leaves alternate, entire: racemes often spiked, ebracteate or sometimes bracteate: pedicels one-flowered; corolla blue, purple or white.

This, like both the preceding, is a large genus, including, according to De Candolle, about 50 species, not one of which, so far as I am aware, is found in the Carnatic, though the accompanying species is common on the elevated mountain regions. On the Neilgherries it is a troublesome weed. The same is the case on the elevated parts of Ceylon. In referring it to the Nepaul species in perference to the Peninsular one, *Heynii*, I was principally guided by the description of the fruit, which, in this, is bristly all over, in that, round the edges, only with short tubercles on the centre. My impression is that they may be the same species, only slightly modified, but whether or not this be the case, further consideration now leads me to think that I would have acted more judiciously had I adopted the latter name as it seems probable that it must be that species while it may not be the one I have called it, though it agrees well with the character and description. When young it greatly resembles a *Myosotis*, and the flowers might readily be substituted for those of the Forget-me-not, as regards both form and colour.

CYNOGLOSSUM FURCATUM (Wall.), stems ramous, adpressed, pubescent or tomentose, the hairs on the lower part reflexed: leaves glaucescent, adpressed-pubescent; radical ones petioled, oval-lanceolate, acute at both ends; cauline ones sessile, the upper ones half-stem-clasping, ovato-cordate: racemes paired, slender, ebracteate, secund, hairy.—Flowers purple, scales of the throat two-lobed.

Neilgherries, very common, rising from one to three feet high, and in flower at nearly all seasons.

This species appears very nearly allied to *C. micranthum*, from which indeed it seems scarcely to differ; I believe, however, this is the true *C. furcatum*. If I have not confounded the two species this has an extensive range of geographical distribution, extending from the Himalayas to Ceylon, and is generally to be met with in alpine regions throughout that wide extent of country.

VERBENACEÆ.

This is a large and, as it now stands in Botanical works, a highly complex order. We find among its species minute procumbent herbs and gigantic trees, flowers so minute that a high magnifier is required for their examination, and others large and showy, some delightfully fragrant, such as the garden Verbena *(V. Peruviana)* and many altogether scentless, many simply white or cream-coloured, and others deeply tinged with blue or purple. In their inflorescence and floral structure, we find the species of this order exhibiting similar variations; the flowers being capitate, spicate, cymose, corymbose, panicled or umbelled. and the ovaries with erect or pendulous ovules. No wonder Botanists have found this a difficult order to deal with, and have shown little inclination to grapple with its heterogeneous combinations. Apparently owing to this cause, Schauer's monograph in De Candolle's Prodromus seems, so far as I am aware, to be the first original composition of the kind. Walper's had already done good service in collecting together all that had been previously published, but his article differs from Schauer's in being mainly a compilation, not an autograph work, derived from the examination of original materials.

In its botanical relations, this order seems to take its place very naturally between *Borragineæ* and *Labiateæ*, the former almost passing into it at several points, while it seems nearly to pass into Labiatæ, at others, but these so delicately that it requires a Botanist to see them.

In its distribution it is more tropically disposed than either of the two orders named, a few only of its species extending so far north as Europe. In the warmer regions of Asia and America, they are most abundant, but a few are found in Africa and Australia. In India they are rather numerous, and some of them of very large size, the teak tree being, however, by far the most conspicuous, and valuable. In Bengal about Jubbulpore there is another large tree which the late Mr. Griffith has described under the name of *Hemigymnia* which he considers nearly allied to the teak, and furnishing timber of nearly equal value. Besides those there are several other large Indian trees that belong to this family, such as *Vitex alata*, *arboria*, *altissima*, all inhabiting the forests covering the slope of our higher ranges of hills. The Clerodendrons however are the most showy of our Indian Verbenaceæ, among which the one here represented is about the most conspicuous. The Indian Verbenas have but little of the fragrance of the Peruvian one now so completely naturalized in the gardens about Ootacamund. The *Clerodendron serratum* is nearly equally deserving of a place in gardens as an ornamental object, since, with a little attention to pruning and culture it might be made a truly showy plant though, in its wild state, disposed to grow tall and ungainly looking.

LANTANA.

Calyx membranaceous, small, obsoletely 3–4-toothed, ciliate, covering the fruit and, with its increase, becoming greatly extended and translucent, at length withering away (abolescens). Corolla tubuloso-infundibuliform, slightly swelling upwards; limb oblique, flat, or inclined, somewhat bilabiate, the upper lip entire or bifid, the lower one lobed. Stamens 4, inserted within the tube of the corolla, didynamous; anthers 2-celled, opening longitudinally. Ovary 2-celled, cells with a single erect ovule; style terminal. short; stigma linear or obliquely capitate. Drupe fleshy or succulent with 2 nuts, shell hard, rough, and

Lantana Indica Roxb.

tuberculate, or rarely smooth. Cotyledons thick, radicle inferior, short. Shrubs or under shrubs, stems 4-sided; leaves opposite or verticelled, simple or feather-nerved, rugous; peduncles axillary, usually single; capitula compact, usually elongating during flowering; calyx pubescent; corolla variously coloured, white, orange, red, purple and often changeable. The odour of the plants of this genus is very peculiar, something between the heavy smell of musk and a rather agreeable fragrance.

This is a large and to the Botanist most intractable genus. Schauer defines 54 species. Fortunately for Indian Botanists, only one or two are Indian. I suspect we may safely lay claim to two, if any confidence is to be placed in the colour of the flowers and fruit. The one common in some parts of the country on the plains has invariably white flowers and fruit, and is the true *L. alba*, according to Schauer, and the one here represented, which is not unfrequent on the Neilgherries below Kotergherry, which is Roxburgh's *L. Indica*. With the exception of the colour of the flower and fruit, they seem very much alike, but in the hands of a Botanist thoroughly conversant with the distinguishing features of this very natural genus, which I am not, it seems not improbable they might be found truly distinct.

The genus is one which so readily naturalizes itself, wherever it is introduced, that it is still a question with some Botanists whether the white-flowered one, which is spread all over India, is truly a native. Dr. Wallich, if I mistake not, is one of those who question its right to be considered a native. Dr. Royle I know does or at all events did believe it a truly Indian plant.

Roxburgh received his plants, corresponding with ours, from Mysore. In Coimbatore, and also in some parts of Mysore, the white-flowered one, which has also white berries, not purple like the Hill one, is very common, and very variable. Growing in open ground, it is a low spreading stunted shrub, but if among bushes or in hedges it rises to the height of 10 or 12 feet. This, I have no doubt, would in similar circumstances do the same, though I am not sure that I ever saw it assuming those gigantic proportions.

The one here represented seems well worthy of a place in gardens, and as it thrives luxuriantly in Calcutta, I presume it would do the same in Madras.

LANTANA INDICA (Roxb.), shrubby, straight, 4-sided, hairy: leaves opposite, cordate, serrate, rugous: peduncles solitary, axillary, shorter than the leaves: heads ovate: bracts ovate, lanceolate: nut 2-celled. Rox. Fl. Ind.

A common plant, widely diffused over the Indian Peninsula, flowering during the rainy and cool seasons.

The plant here represented is certainly Roxburgh's, I have therefore retained his name and character. But since the plate was printed, I have received D. C. Prod. Vol. XI. in which I find it reduced to a synonyme of *L. alba* by Schauer, with the following character.

L. alba (Miller, &c.), straight, branches virgate and with the peduncles 4-sided, rough and strigose: leaves opposite, short petioled, elliptic, or roundish, ovate, or sub-cordate; acuminate, coarsely crenato-serrate, rugous, hirto-scabrous above, whitish, villous beneath: peduncles axillary, rigid, spreading, thickened above: capitula hemispherical, spicato-elongated: bracts ovato-roundish or elliptico-ovate, acuminate, half the length of the corolla, exterior ones involucrate, foliaceous, spreading.

This is a variable plant, seen growing on the open ground, it is a low, spreading, procumbent shrub, but if near support, in hedges or among bushes, it often attains the height of 6 or 8 feet, and is then one of considerable beauty on account of the profusion of its heads of pure white flowers.

On the higher slopes of the Neilgherries, the flowers are usually coloured, and look so different from the plant of the plains, that one is almost led to doubt their identity, but on comparison, I could not discover specific marks by which to distinguish them.

CLERODENDRON.

Calyx campanulate, rarely tubular, sometimes 5-angled, or somewhat inflated, 5-cleft or toothed, seldom truncated. Corolla funnel-shaped or somewhat salver-shaped, tube usually conspicuously exceeding the calyx, sometimes very long; limb five-parted, the two upper divisions a little larger. Stamens 4, inserted on the tube of the corolla, much exserted, sub-didynamous; anthers 2-celled, cells parallel opening longitudinally. Ovary 4-celled, cells with one pendulous ovule: style filiform, exserted; stigma 2-cleft, acute. Drupe within the enlarged, persistent calyx, baccate, 4- or by abortion 1-seeded, usually 2–4-lobed, nuts woody, smooth. Seed solitary, pendulous, cotyledons oily, radicle short, inferior. Shrubs, or small trees, leaves opposite or ternate, simple, entire, or rarely lobed: cymes trichotomous, axillary or collected into a terminal panicle.

Of this genus, Schauer enumerates 87 more or less perfectly described species, and 5 Indian ones of which he only knows the names. Forty-nine of these he had either examined or had no doubt about; of

23 he felt somewhat uncertain, and marked as species requiring further examination, and the remaining are said to be "species dubiæ," meaning by that, many of them are probably described under other names, but which he cannot with certainty ascertain for want of specimens. Of the 92 species named, 34 are from India, and about half the number from the Eastern Islands and China; Australia, Africa and America contribute the rest. Many are plants of great beauty, and are prized as conservatory and hot-house plants in English collections, and several have been figured in English Botanical periodicals.

Some of the species are remarkable for the very heavy disagreeable odour their leaves give out when bruised, somewhat similar to that of the well-known green-bug of India. The C. INERME which is, or used to be, employed as a substitute for the Privet, as an edging for garden walks about Madras and elsewhere near the coast, partakes of this quality in a very marked degree. In addition to the *C. serratum*, there is another with pretty large white flowers, not uncommon on the Hills about Coonoor and the slopes below that station, called *C. infortunatum* in allusion to some supposed unhappy property. The name *Clerodendron* means literally Fate-tree—hence we have among its species the curious specific names of *C. fortunatum*, *C. calamitosum*, *C. infortunatum*, though there is no reason to believe them better or worse than their neighbours. We have again among its species, *C. fragrans* and *C. putre*, the latter being described as a "planta fætidissima." One of the Indian species is said to be used medicinally by the Natives but I do not know for what purpose.

In regard to the extent of its geographical distribution, *C. serratum* is remarkable, Nepaul, Silhet, Assam, Java, Ceylon, and generally over the Peninsular mountains.

CLERODENDRON SERRATUM (Sprengel), ramuli quadrangular, furrowed, and with the leaves glabrous: leaves opposite or ternate, chartaceous, short petioled, ovate, oblong or even lanceolate, cuniato-attenuate, entire at the base, acuminate, remotely mucronato-serrato-dentate, somewhat shining above, pale beneath: panicles terminal, raceme-like, whitish, from mealy pubescence: lower bract, and bracteoles foliaceous, pale, membranaceous, acuminate, bracts ovate, roundish, bracteoles lanceolate: cymes two or three times trifid, loose: calyx cup-shaped, sub-truncated, very shortly 5-toothed: tube of the corolla cylindrical, more than twice the length of the calyx.

A rather common plant, in shady woods and sub-alpine jungles. Abundant on the Neilgherries, and there growing in open pasture ground, a very conspicuous object.

The leaves are deep green, the flowers blue, deeper at the apex, becoming paler downwards, sometimes with a considerable tinge of rose, which adds greatly to the beauty of this already handsome plant. The shrub varies from one to six feet in height, rarely so low as the first, or higher than the last.

GMELINA.

Calyx cup-shaped, 4–5-toothed, persistent, somewhat enlarged with the fruit. Corolla tubular at the base, greatly enlarged at the throat, ventricosely bell-shaped; limb spreading, bilabiately 4–5-lobed, the anterior one larger, inflexed in æstivation. Stamens 4, didynamous, ascending, scarcely exserted; anthers 2-celled, attached by the middle, cells distinct, opening longitudinally. Ovary 2–4-celled, cells 1-ovuled; style filiform; stigma equally bifid. Drupe baccate, nut solitary, berry smooth, 4-celled, perforated at the base. Seed pendulous radicle inferior. Shrubs or sometimes large trees, branches usually thorny: leaves simple, opposite, entire or lobed; inflorescence cymoso-paniculate, panicles raceme-like or composed o short few-flowered decussating cymules, or simply racemed; bracts often caducous; corolla conspicuous. Drupe large, oblong.

This is a small genus of some 10 or 11 species, only 7 of which are defined in Schauer's monograph. Since its publication, Sir W. Hooker published one, I believe the one here represented, under the name of *G. Rheedii*, accompanied by a figure. I have seen neither the figure nor description and therefore cannot state his reasons for considering it distinct from Roxburgh's *G. arborea*.

When I published the accompanying plate in the Icones, I was, as will be seen by the remarks appended to the specific character which accompanied, of opinion that the Malabar plant was not distinct from the Bengal one. I am now quite satisfied that they are different species and most easily distinguished, so easily that I now almost wonder how I then overlooked the palpable difference, even though the same specific character, with the exception of a single word might serve for both. That exception is found in the corolla. In Roxburgh's plant it is 4-lobed with the larger anterior one emarginate, in ours it is 5-lobed with the larger lobe entire. But for this difference of structure, I should have hesitated to consider them

Clerodendron senatum (Spr.)

Gerardia arborea (Roxb)

distinct, but aided by this character, which is shown in Rheede's plate, I can have no hesitation in adopting Sir William's name, and accordingly request that the name on the plate be changed from *G. arborea*, Roxb., to *G. Rheedii*, Hooker.

In transcribing the generic character from Schauer, I have taken the liberty of making some alterations. I have introduced into mine the æstivation of the corolla, not alluded to by him. Again I have allowed it a 4- or 5-lobed bilabiate limb, and in place of "seed erect" have said "seed pendulous, radicle inferior" which they really are, being attached to the apex of the cell. I do not understand the principle on which he allows pendulous ovules and erect seed, the attachment of both being the same, unless it be on the theoretical one, that an inferior radicle constitutes an erect seed, however attached. If this is the view on which that mode of expression rests, it seems an erroneous one, as in description facts, not theories, ought to be given, and therefore "radicle inferior" would have been better, as stating clearly what is the case, whereas to call a seed erect which is evidently pendulous, unless guarded by previous explanation, must tend to mislead.

Gmelina Rheedii (Hooker. *G. arborea* Roxb. R. W. Ic. No. 1470) arboreous, unarmed, ramuli and young leaves covered with a greyish, powdery tomentum: leaves long, petioled, cordate or somewhat produced and acute at the base, acuminate, the adult ones glabrous above, greyish tomentose beneath, with 2–4 glands at the base: panicles tomentose, axillary and terminal raceme-like; cymules decussate, trichotomous, few-flowered: bracts lanceolate, deciduous: the acutely dentate calyx, eglandulose.

A small tree, not unfrequent in the Paulghaut jungles, and generally distributed in Malabar.

The drawing was made from a specimen obtained near Coonoor on the Neilgherries, and seems to correspond sufficiently with both Roxburgh's figure and description. I advert to this, as I understand Sir W. Hooker has made a new species, under the name of *G. Rheedii*, of what I suspect can at best be viewed as a variety of this species, that is, he views the plant he figures and describes as identical with Rheede's Hort. Mal. 1 tab. 41, but as having no affinity with Roxburgh's Cor. Plants, tab. 246. As I have not seen either his figure or description, and have only portions of Roxburgh's and Rheede's figures, copied from the originals, not the entire plates to compare, I am not in a position to offer an opinion on Sir William's views, but on comparing my specimens with Roxburgh's description, can see no reason to doubt their belonging to the same species, though there be considerable discrepancy between their leaves and those of Roxburgh's plant, as shown in his plate. The differences however are not such as I think ought to have specific value attached, if the other characters correspond, the more so, as I find among my specimens intermediate forms connecting the two extremes, and showing that they belong to the same species, and thence that such slight differences in the outline of the foliage can scarcely be admitted as of itself affording a sufficient specific mark.

LABIATÆ.

This, after Compositæ and Leguminosæ, is the largest order of dicotyledonous plants, including upwards of 2500 species, and is to the full as natural as the former. Such being the case, its distinctive characters are few and very explicit. In the words of Mr. Bentham, its great Historian, "The order of *Labiatæ* is one of the most natural and distinctly-marked of all. The opposite leaves, monopetalous corolla, 2 or 4 stamina, and the free 4-lobed ovarium; are characters so easily observed and so constantly accompanying the general habit of the whole series, that, from the time of Linnæus to the present day but two or three genera have been improperly associated with or separated from it." He adds, "its immediate affinities are but few." So truly is this the case that it may almost be said to be isolated and stand apart from all the orders of its class. Those to which it most nearly approaches are *Verbenaceæ* and *Borragineæ*, but still it can scarcely be confounded with either. One genus only, consisting of a single species, seems to fluctuate between this and *Verbenaceæ* and, that owing rather to the plant being imperfectly known (from want of perfect seed), than to the difficulty of drawing the line between well-known plants. In a linear series this order unquestionably occupies one end, for, while *Verbenaceæ* may perhaps be said to pass into it through *Holmskioldia*, it passes into no other. In some respects, *Borragineæ* are allied, but in all others they are amply distinct.

The order is made up of the plants commonly known under the names, Basel, Mint, Marjorum, Thyme, Lavender, Sage, Rosemary, Hyssop, Balm, and many others, some or all of which must be familiar to nearly all readers. Its species are distributed all over the world, from Melville Island to Terra del Fuego, but most abound in temperate regions, which tends to account for their frequency on these mountains, and generally on elevated alpine regions throughout India. Of about 200 species named in Wallich's list of Indian plants a large proportion were obtained from the Himalayas and Northern Provinces. A few only are natives of the plains of India but some of these are certainly endowed with the property of enduring a high temperature.

Being thus alpine in its habits, I have devoted a larger number of plates to the illustration of this family than to any of its neighbours, though they too are sufficiently interesting.

Botanically considered, this, next to *Compositeæ*, is one of the most difficult families with which the Botanist has to grapple, for, being so exceedingly natural, every genus seems imperceptibly to pass into its next neighbour and even the species seem to be almost indefinable, forms of one passing into another by such insensible gradations that one is often disposed to reduce two or three into one, for want of sufficiently tangible distinctions by which to keep them distinct. For myself I often felt inclined to do so, on the supposition that some of them must have been taken up from solitary specimens of varying forms, or from indifferent or bad specimens. Such a proceeding, however, ought always to be avoided, unless based on the clearest evidence, and supported by reference to, and comparison with, authentically-named specimens, which are seldom available in India, where there are no herbaria.

This cautious course it is desirable to follow at all times, but especially while studying families so truly natural as the Labiatæ, and those who wish to form collections, either for their own use or for friends, should make a point of preserving a considerable number of specimens of each species, and, when possible, selected from several individuals of the species, as affording the probability of securing nearly all the varying forms it is likely to present.

As regards the properties of this extensive order much might be said, as so many of them are highly aromatic and appropriated in so many ways to supply the wants, or provide luxuries for the benefit of mankind, but it is not my intention to expatiate largely on this branch of the subject, simply because, so few if any of the native species of the Neilgherry ones are so appropriated. As, however, many of the most useful are already or might easily be introduced, I cannot altogether pass the subject in silence, and shall therefore devote a few lines to its consideration.

When the leaves, &c., of a labiate plant are closely looked at they will be found to contain numerous little reservoirs of oil which, when bruised, for the most part give out a fragrant aromatic smell, and communicate to the tongue a pungent sensation and aromatic flavour. It is in this oil that the properties of these plants principally reside. Hence their aromatic properties, and hence also, their being generally destitute of any deleterious qualities. Some, however, are said to combine tonic and astringent powers in addition, and as such have been beneficially prescribed in cases of indigestion and looseness consequent on imperfect assimilation of food, and also in cases of low fever, proceeding from debility. But their principal medicinal use is as carminitives in flatulent colic, for which purposes various species of mint are greatly in repute. Peppermint is

much esteemed in such cases, but Spearmint and Pennyroyal are also in great request at Home, hence the frequent use of mint tea by invalids, especially in the country, where domestic medicine is much resorted to. Lavender oil, obtained from the *Lavandula vera*, is also in great esteem. It forms the basis of the well-known Spirits of Lavender. Of the very numerous species of sage, only one or two seem to be used medicinally, namely, the officinal or garden sage. The Indian sage, which has similar properties, has been separated to form a distinct genus, under the name of *Meriandra*. It grows freely at Ootacamund, and might be cultivated to any required extent as a substitute for the true garden sage. The Rosemary is another plant deserving attention. In medicine it has been employed as a cephalic, for the relief of headache, but is principally remarkable for its power of promoting the growth of hair, "it is in fact what causes the green colour of the best pomatums used for that purpose," Lind., and an infusion of it keeps the hair in curl during damp weather. The patchouli or Pucha-pat, of which large quantities are exported from Penang for stuffing mattresses and pillows, is a species of *Pogostemon*. Its strong smelling leaves are supposed by the Natives to keep off contagion and prolong life. It is now largely consumed in Europe. The Horehound *(Marrubium vulgare)* is a popular and useful remedy at Home, for coughs and more severe forms of cold, by restoring the tone of the stomach and allaying irritation: for these purposes it is prescribed in form of infusion and lozenges. The *Prunella vulgaris*, a native of the Hills, is prescribed in domestic medicine as a febrifuge. Of the Indian Labiates the *Ocima* or Basels are used for similar cases as those for which mints are prescribed in Europe. The most extensive consumption, however, of the plants of this family is not medicinally, but in cookery, under the name of "sweet herbs," for flavouring cooked dishes and sauces, and in perfumery, while many are cultivated for their beauty as garden ornaments, especially the sages.

PLECTRANTHUS.

Calyx campanulate, 5-toothed, teeth equal or the upper one larger; enlarging with the seed and then declining, straight, incurved, or inflated with the teeth equal or variously 2-lipped, sometimes erect, tubular, or campanulate, equally 5-toothed. Tube of the corolla exserted gibbous above the base, or calcarate, then abruptly declining (declinato defracto) or nearly straight; throat equal or rarely inflated, the upper lip 3–4 cleft, the lower one entire, often longer concave. Stamens declinate, didynamous, the lower ones longer; filaments free edentulate; anthers ovate, reniform, cells confluent or rarely somewhat distinct, divaricate; style 2-cleft at the apex, lobes about equal, subulate, with minute terminal stigmas. Herbs, undershrubs, or shrubs. Racemes terminal, simple or ramous; verticillasters lax, many-flowered, usually producing cymes on each side, rarely contracted into dense verticillasters. Benth.

The essential character of the genus is comprised in these few words:

"Inferior lobe of the corolla elongated, concave. Calyx of the fruit dentate, not spiny, mouth open. Filaments free." By this last mark it is distinguished from Coleus, which it sometimes much resembles, in which the filaments are united, or monadelphous, at the base.

This is a genus of great extent, including, as it now stands in De Candolle's Prodromus, 65 species, natives of Asia, Australia, and Africa, one only having as yet been found in America. It is a very natural genus and the species, assuming that they are all good, run so much into each other as to render their discrimination often exceedingly difficult, hence, giving rise to the suspicion that some at least, are but varieties. The one here represented is very abundant in some places on the Hills, usually selecting low moist ground on the banks of streams; it is, if possible, still more common on some of the higher ranges of the Pulney mountains. In such situations, when sheltered by adjoining woods, it often grows to the height of 5 or 6 feet. The

flowers are too small to attract the notice of cursory observers, but when looked into with the aid of a magnifier are not deficient in beauty, being finely speckled with red spots, on a white ground. The calyx, too, is spangled with bright resinous glands. The specimen represented is, for the convenience of space, taken from a small plant, or may be merely a side branch. The figure in the upper corner is the tip of a branch further advanced to give some, though an imperfect, idea of what the plant becomes when every branch has become similarly developed.

I have not heard of this plant being applied to any useful purpose, but, as it possesses the usual properties of the family, I imagine some use might be found for it. The scent it exhales is so strong that I have heard it represented as quite overpowering. I was not myself sensible of this effect which therefore must be attributable rather to individual sensitiveness to strong smells than to any peculiarity of the scent.

PLECTRANTHUS WIGHTII (Benth.), herbaceous, erect, ramous: leaves petioled, broadly ovate or rounded, acuminate, cordate at the base, smooth on both sides or pubescent; the inferior floral ones conformable; the superior ones and bracts membranaceous, rotundato-spathulate, shorter than the peduncles and pedicels: panicles very ramous, many-flowered: fructiferous calyx declinate, oblong, incurved, striated, glabrous, with the mouth obliquely bilabiate: the teeth nearly equal, ovate: stamens exserted.—Leaves from one to two inches long or, on young, luxuriant plants, larger, usually longish, acuminate; serratures obtuse or acute: panicles large, loose: flowers white, speckled with red points, tube of the corolla about as wide as long, the upper lip ascending, 4-lobed, each lobe marked with two red spots at the base, the inferior narrower, longer, concave. Stamens free, exserted.

Neilgherries and Pulney Mountains, frequent, flowering during the autumnal months. The small size of the flowers prevents this from becoming the garden favourite which it deserves to be. The specimen selected by the draughtsman is rather too young to furnish a correct idea of the specific characters. It is distinguished by Mr. Bentham from *P. scrophularioides*, on the one side, and *P. striatus*, on the other, but with an extensive series of specimens before me, from different stations, and authentic specimens of all the three species to compare, I find I cannot unravel them.

ANISOCHILUS.

Fructiferous calyx ovate, suberect, the base or middle inflated, contracted above; limb either bilabiate, the upper lip incumbent on the truncated lower one, closing the calyx, or obliquely 5-toothed, the upper one longer, incurved or incumbent. Tube of the corolla slender, abruptly bent beyond the calyx, throat dilated, upper lip short, obtuse, 3–4-cleft, the lower one elongated, concave. Stamens 4, filaments free, edentulate, style subulate at the apex, equally bifid. Hypogynous disk lobed, the posterior lobe often higher than the ovaries. Herbs or (undershrubs?) verticillasters, densely imbricated, forming ovate, oblong, or cylindrical spikes. Floral leaves bract-like, caducous, shorter than the flowers, or rarely the upper ones longer, forming a terminal tuft.

ESSENTIAL CHARACTER.—Lower lobe of the corolla elongated, concave, upper lip of the fructiferous calyx incumbent on the lower, or the inflexed teeth closing the mouth.

Of this genus Mr. Bentham describes eight species, six of which are natives of the Indian Peninsula. The following species are not among them. This addition raises the number to ten, but certainly does not take all in, there being still one or two undescribed species in my collection. As in most of the other genera of this order, their discrimination is very difficult, partly owing to the striking family likeness which runs through the whole, and partly to their liability to run into variations according to the kind of soil in which they happen to grow. The grand distinguishing feature of the genus, is the dense inflorescence and the peculiar way in which the mouth of the fructiferous calyx is closed with the deflexed upper lip. Where these occur, there can scarcely be any hesitation in regard to the genus. The species, as already said, are not always so easily made out.

ANISOCHILUS PURPUREUM (R. W.), stem procumbent at the base, branches ascending or erect, sericeo-villous: leaves petioled, obovato-spathulate, obtuse or sub-orbicular, entire, fleshy: spikes axillary and terminal, peduncled: bracts lanceolate, acute, pilose, about the length of the calyx: flowers purple, corolla marcescent, tubular, 2-lipped; upper 4-lobed, erect, under entire, deflexed: stamens exserted: under lip of the fructiferous calyx minute, upper larger, deflexed, 3-toothed.

Neilgherries, on the eastern slopes, about Coonoor, on large stones covered with vegetable earth, flowering February and March.

The specimen selected by the draughtsman is defective, as not showing the general habit of the species, which is usually, but not always, procumbent, with

Govindoo, del. Dumortier Sculp.

Pleiranthus Wightii, Benth.

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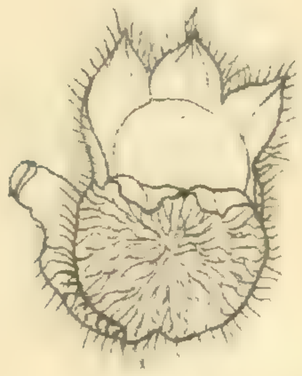

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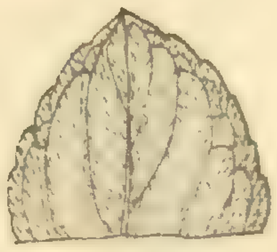

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Corrandoo, del. Dunphy, Lith.

Anisochilus purpureum (R. W.)

Drawn by Sowerby del.

Drawn on Stone by W. Fitch

Prostanthera suffruticosa (R.M.)

ascending or erect branches. The specimen is evidently an erect branch of a very luxuriant plant. This is perhaps too nearly allied to the following, but I have kept them distinct, partly on account of the difference of colour of the flowers, purple in this, white in that, and partly on account of the unusual feature of the marcesent corolla in this, deciduous in the other.

ANISOCHILUS SUFFRUTICOSUM (R.W.), suffruticose, erect, ramous, young shoots and leaves densely villous: leaves short, petioled, ovate, lanceolate, prominently veined beneath, when dry deeply reticulated between the veins: spikes numerous, long, peduncled, congested on the ends of the branches: corolla tubular, deflexed from the base, 2-lipped; upper lip 3-lobed, the middle lobe larger, emarginate, under entire, obtuse: stamens the length of the corolla: under lip of the fructiferous calyx minute, upper much larger, entire, round at the apex, deflexed.

Sisparah, on the western slopes of the Neilgherries, on rocky clifts, among long grass, flowering December and January. Stems apparently annual, from two to three feet high, but the roots seem perennial, as old, withered plants were noticed with young shoots at the base.

POGOSTEMON.

Calyx ovato-tubular, equal, 5-toothed, throat naked within. Tube of the corolla incluse, limb 4-cleft, sub-bilabiate, the upper lip trifid the inferior one entire, all the lobes quite entire, about equal, spreading. Stamens four, exserted, straight or somewhat declining; filaments bearded about the middle or naked; anthers terminal, one-celled opening transversely, style equally bifid at the point, lobes subulate. Herbs (or under shrubs?). Leaves opposite, petioled or entire, dentate or somewhat lobed; verticillasters many-flowered, equal or somewhat secund, sometimes glomerato-spicate supported by bracts, the spiculæ racemoso-paniculate, sometimes loosely approximate in spike-like racemes.

ESSENTIAL CHARACTER. Anthers from the first 1-celled, sub-globose. The three upper lobes of the corolla approximated, the lower one declining. Stamens sub-declinate.

Of this genus 30 species are enumerated, 23 of which are natives of India, and several of the remainder from the Eastern Islands. Of the Indian ones five or six are natives of the Neilgherries. The two here given represent two distinct forms, one has naked the other bearded stamens, and one has glomerate verticillasters the other spike-like racemes, but in both the lower lip of the corolla is scarcely distinct from the upper.

To this genus belongs the Putcha-pat before alluded to, as being so much prized, as a scent, among Natives, especially Mahomedans and more recently in Europe.

The following account of the properties and uses of that plant I extract from a paper by Dr. Pareira published in the Pharmaceutical Journal for August 1844.

"Under the name of *Patchouli* or *Pucha-pat*, are imported into this country" (only within these seven years, as Mr. Ellis informs us) "the dried foliaceous tops of a strongly odoriferous plant, called, in Bengalee as well as in Hindee, *Pucha-pat*. On the 27th of June, 1844, Mr. Ellis, drug-broker, of Fenchurch-street, put up for sale, at Garraway's Coffee-house, forty-six cases of this substance. Some of the packages consisted of half boxes, containing 50lbs. each, others of whole boxes holding 110lbs. each." (It was considered enough for ten years' consumption!) "The price asked was six shillings per pound, but there were no biddings. This lot came from New York, to which place it was said to have been carried from China. The dried tops imported into England are a foot or more in length. The odour is strong and peculiar; I cannot call it agreeable, though some others do, while many persons regard it as disagreeable. It is somewhat analogous to that of *Chenopodium anthelminticum*. The taste of the dried plant is very slight. By distillation it yields a *volatile oil*, on which the odour and remarkable properties depend. In Europe it is principally used for perfumery purposes. *Sachets de Patchouli* are sold in the shops. They consist of a few grains of the coarsely-powdered herb, mixed with cotton-wool, and folded in paper. Placed in drawers, chests, &c. they are said to drive away insects from linen, shawls, &c. An *Essence de Patchouli* is used by perfumers, principally for mixing with other scents in the preparation of compounded perfumes: for this purpose it is considered very useful. In India it is used as an ingredient in tobacco and for scenting the hair of women."

"An ingenious writer, in the Gardener's Chronicle (1849, p. 645), on the odours of plants, remarks—'It has been said, by an eminent French perfumer, that the odour of *Patchouli* was a 'disgrace to the art;' such, however, is the result of fashion, that a year or two ago no lady of *ton* was perfect unless she was enveloped, as it were, in the fragrance of this plant, the odour of which is very peculiar—a sort of dry,

mouldy, or earthy smell—not very enticing, certainly, by description, and much less so in reality. The characteristic smell of Chinese or Indian Ink is owing to an admixture of this plant in its manufacture. In the vegetable world it is the most permanent of odours. The origin of its use is this. A few years ago, real Indian shawls bore an extravagant price, and purchasers could always distinguish them by their odour; in fact, they were perfumed with *Patchouli*. The French manufacturers at length discovered this secret, and used to import this plant to perfume articles of their make, and thus palm off home-spun shawls for real India!"

Neither of the species here represented nor indeed any of those I recollect growing on the Hills quite accords with the true Putcha-pat but *P. rotundatum* is that which comes nearest, and I think it probable that some one of the 4 or 5 species indigenous on the Neilgherries will be found, on trial, imbued with its peculiar fragrance.

Of course it will be necessary to dry the plant, and I fancy by exposure to the sun, as hay is dried, to bring it out.

POGOSTEMON ROTUNDATUM (Benth.), villous, stem ascending: leaves roundish, doubly crenate, truncated or cordate at the base; the upper floral ones shorter than the calyx: racemes simple, verticillasters equal, distinct (sub-remotis): bracts linear subulate: teeth of the calyx lanceolate, villous: filaments bearded.

Neilgherries, frequent about the outskirts of woods, and in neglected, broken ground, flowering most part of the year, but in greatest perfection during March and April.

A low growing plant, somewhat spreading at the base, afterwards ascending, leaves softly villous, racemes 2 to 6 inches long, compact towards the apex, flowers small, white.

POGOSTEMON SPECIOSUM (Bentham), piloso-hispid; stem erect: leaves broad, ovate, cordate at the base, doubly crenate: racemes simple: verticillasters terete, loosely approximated: bracts minute: teeth of the tubular, nearly glabrous, calyx subulate: filaments naked.

Common about the outskirts of woods, on the Neilgherries, usually in moist soil, flowering during the rainy and cold season.

MICROMERIA.

Calyx tubular, 13 or 15 striated, 5-dentate, teeth about equal, straight or scarcely 2-lipped, throat usually villous within. Tube of the corolla equal, straight, naked within, usually shorter than the calyx; limb 2-lipped, upper lip erect, entire, or emarginate; lower one spreading, 3-lobed, lobes about equal, or the middle one broader, entire, or emarginate. Stamens 4, didynamous, the inferior ones longer, ascending arcuato-connivent at the apex, shorter than the corolla or rarely exserted: anthers 2-celled, the connectivum often thickened, cells diverging or at length devaricate, connective adnate. Lobes of the style sometimes equal, subulate, sometimes the upper one shorter the lower elongated, recurved, flattened. Nuts dry, smooth. Under shrubs or herbs; verticillasters axillary or spicate, rarely cyme-like or sub-panicled. Flowers usually small, purplish or white.

This is a large genus including, according to Mr. Bentham's list, 59 species, only two of which are natives of India, the one here represented and another found by Dr. Falconer on the banks of the Hydaspes. Our one has a very extensive geographical range, the Himalayas from Mussooree to Khasya, Arabia Felix, Abyssinia, Southern Africa, near the Cape, and the higher mountain ranges of Southern India and probably Ceylon. The species is interesting to Europeans in India, from its striking resemblance to the wild thyme of Europe, a resemblance which, in the first instance, led to its being described under that name. It is very common on the Hills.

MICROMERIA BIFLORA (Bentham), suffruticose, very ramous, cæspitose, branches ascending, pubescent or pilose: leaves sessile, ovate, acute, flat or revolute on the edges, rigid, glabrous, subcordate at the base; the superior ones shorter than the flowers: verticillasters loose, few-flowered: braits equalling the pedicels: calices pedicelled, sub-secund, delicately pubescent, or slightly pilose; throat villous within.

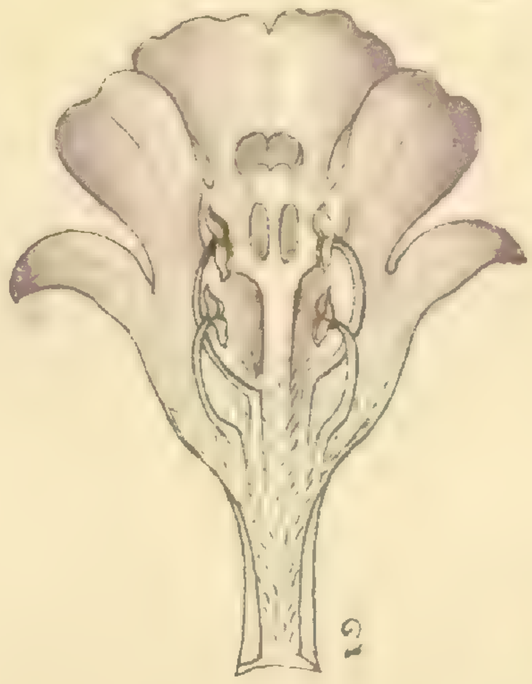
Very common on the Neilgherries, and always in flower.

A low growing, very branchy plant, forming dense tufts of matted branches, from 4 to 6 or 8 inches long, the extremities thickly covered with its small, ovate, translucent-dotted leaves, from among which its numerous, pale-reddish, blue or pink flowers project. Calyx strongly ribbed; segments acute. Corolla nearly twice the length of the calyx, obscurely 2-lipped, the upper one emarginate, scarcely larger than the three lobes of the lower. Stamens incluse, anther cells divaricated. Achænia seated in a cup-shaped disk.

Govindoo del. Thompson Lith.

Pogostemon rotundatum (Benth.)

Pogostemon Speciosum (Benth)



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Cervicino del

Trumpky, Lith.

Micromeria Piperella Benth.

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Salvia sylvestris Linn

PRUNELLA.

Calyx tubuloso-campanulate, irregularly, about 10-nerved, and reticulately veined, flat above, bilabiate, the upper lip broad, truncated, shortly 3-toothed, the lower one half bifid with the lobes lanceolate, throat naked within. Tube of the corolla large, sub-exserted, ascending, within, near the base, annulate with scales or hairs; upper lip erect galiate, somewhat keeled above, entire, the lower one 3-lobed dependent, the lateral lobes oblong, deflexed, the middle one rounded, concave, crenulate. Stamens exserted, filaments edentulate at the base, glabrous, shortly bidentate at the apex, the lower tooth bearing the anthers: anthers approximated by pairs under the upper lip, free, two-celled, cells distinct divaricated. Gynobase equal, straight. Style glabrous, bifid at the apex, lobes subulate. Nuts oblong, dry, smooth. Herbaceous plants, verticillasters 6-flowered, densely spicate. Floral leaves bract-like, orbiculate, persistent, equaling the calyxes and imbricated with them.

This, though a small genus, is interesting owing to the almost unlimited distribution of the species here given. It seems to be found everywhere, but in Southern India only on the Neilgherries—Europe, Africa, Asia, America, and Australia, all have it. In Northern India several stations along the line of the Himalayas are indicated, but the Neilgherries, so far as I am aware, is the only one in the south.

This genus was originally called Brunella, derived from the German word *brune*, pronounced as if written *prune*, hence it got changed to Prunella, which it has retained for nearly a century. The younger De Candolle has, to my mind most unnecessarily, restored the old orthography thereby creating some confusion which might as well have been avoided, since nothing is gained to science by the change. The word Brune, is the German name of a kind of inflammatory sore throat for the cure of which the infusion and expressed juice were considered efficient remedies, whence the name Brunella, pronounced like prunella.

PRUNELLA VULGARIS (Linn), leaves petioled, ovate or oblong, entire, dentate, or inciso-pinnatifid: teeth of the upper lip of the calyx truncated, aristate, or sub-muticous, or rarely sub-lanceolate: corolla from a half to twice as long as the calyx.

A very common plant by road sides, and in pastures on the Neilgherries.

This is a very generally distributed plant, being, in the language of Mr. Bentham, found "fere in toto orbe terrarum," and is introduced here as a rare example of a plant so universally diffused.

LEUCAS.

Calyx tubular or tubuloso-campanulate, striated, straight or recurved at the apex, mouth equal or obliquely elongated either above or below, 8- or 10-toothed. Tube of the corolla within the calyx, annulate or naked within, limb bilabiate, the upper one concave, erect, entire or rarely emarginate, very hairy above, the lower one longer, spreading, trifid, the middle lobe the largest. Stamens under the helmet ascending: filaments naked or sometimes pubescent at the base; anthers under the upper lip approximated by pairs, somewhat 2-celled, cells divaricating, confluent. Upper lobe of the style very short, inferior, subulate. Nuts 3, angular, obtuse. Herbs or under shrubs; leaves entire or dentate, the floral ones conformable; verticillasters sometimes few, sometimes densely many-flowered; corolla usually white, rarely purplish.

This is a large genus, including 48 species, 41 of which are natives of India. Of these 41, ten or twelve, possibly more, are natives of the Neilgherries. A genus so pre-eminently Indian and alpine ought, I believe, to have been more liberally illustrated in this work, but want of space prevented. Two of the Neilgherry ones I have ascertained to be mere variations of one species, there being no appreciable difference between *L. helianthemifolia* and *ternifolia*, all the others are, I believe, good species. The species of the genus are very generally distributed over India, and are every where to be met with from the Himalayas to Cape Comorin. One, *L. Zeylanica*, is used as a remedy against eruptive diseases by the Natives, but generally they are little thought of and present too weed-like an appearance to be admitted into gardens, though some are not devoid of beauty. In habit they so much resemble each other, that on any one species being well known, almost every other may be recognized as a member of the genus. This was one reason for my giving only a single plate to so large a genus.

LEUCAS (ASTRODON) SUFFRUTICOSA (Benth.), branches rufo-villous, leafy at the base: leaves sessile, oblong, lanceolate or linear, entire, green, hispid above, whitish tomentose beneath: bracts subulate: calyx rufo-villous, mouth truncated, teeth short, spreading.

Common in pastures on the Neilgherries.

A low plant, from 8 to 12 inches high, readily distinguished by the leafy base and long, rusty-coloured, almost naked branches, ending in 1 or 2 capitate verticillasters. Flowering during the autumnal months.

TEUCRIUM.

Calyx tubular or campanulate, rarely inflated, 5-toothed, teeth equal or the upper one often broader. Tube of the corolla short, exannulate within, the 4 upper lobes of the limb about equal, or the upper ones longer and broader, sometimes oblong, declining, sometimes very short, nearly erect, the lower one large roundish or oblong, often concave. Stamens 4, protruding between the upper lobes, didynamous, the inferior pair longer: cells of the anthers confluent. Style equally bifid at the apex. Nuts in most of the species coarsely reticulato-rugose, in a few however with the reticulations scarcely elevated, in all obliquely attached by the interior side of the base. Herbs or under shrubs variable in habit and inflorescence.

This very large genus, including 91 species, only furnishes six Indian ones, and this is the only one that occurs so far south. Mr. Bentham alludes to a specimen from the Neilgherries in DC.'s herbarium as apparently appertaining to his *T. Fortunii*, a Chinese plant; I cannot however suppose that specimen different from the plant here represented, and, judging from the character only, I should suppose the Chinese plant not specifically distinct from this. This plant is common and abounds in the wood above Belle Vue house (formerly Kelso Cottage), flowering in December and January. Possibly this may not be the true *T. tomentosum* but I see no very obvious difference between it and specimens so named by Mr. Bentham. On this however I do not lay much stress, for I had not the character of the new species before me when naming it, and the two being very like, I might easily have overlooked as mere variations, good specific characters. But to enable those who may take an interest in the question to determine the point for themselves, I give the characters of both species for comparison with the Neilgherry plant. On recomparing the specimens while writing these notes I find the difference of aspect sufficiently marked to give rise to strong suspicions that this plant is not the true *T. tomentosum* while it seems to accord well with the character of *T. Fortunii*. The differences are such as almost to satisfy me that *T. Fortunii* is a good species, a point on which Mr. Bentham seems still to entertain doubts.

TEUCRIUM TOMENTOSUM (Heyne), suffruticose, erect, branches tomentoso-pubescent: leaves ovate, rounded at the base, villous above; tomentoso-pubescent, whitish beneath, or rarely sub-glabrous: racemes paniculato-ramous: calyx declinate, pilose, bilabiate, the upper tooth broadest.

Neilgherries, abundant on the hill behind Kelso Cottage, in poor, arid soil. Flowering after the rains.

A sufficiently conspicuous plant, from the almost naked, sterile soils in which it luxuriates, attaining in such places, from 1 to 2 feet in height and, under the shade of trees, is even higher than that. The leaves are of a pale green colour, and acquire a whitish hue from the white pubescence with which they are clothed: flowers pale rose-colour, or sometimes nearly white.

TEUCRIUM FORTUNII (Benth.), herbaceous, erect, branches rough: leaves short petioled, ovate or oblong serrulato-crenate, cordate at the base, wrinkled, villous, whitish or yellowish beneath: racemes ramous: floral leaves ovate, scarcely longer than the pedicel: calyx declining, sub-bilabiate, upper tooth broader, rough, tube of the corolla equaling the calyx. CHINA.—FORTUNE. This species as regards foliage, clothing and calyx appears allied to *T. quadrifarium*, as regards inflorescence to *T. tomentosum*. A specimen in DC.'s herb. From Perrottet gathered on the Neilgherries, seems to belong to this species. This species is distinguished by its hairyness, its wrinkled leaves, and its small bract-like floral leaves. It however demands further examination.

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Gonnadon del. Dumphy, Lith.

Leucas suffruticosa

Govindoo, del.

Dumphy, Lith.

Teucrium (S.) tomentosum (Heyne)

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